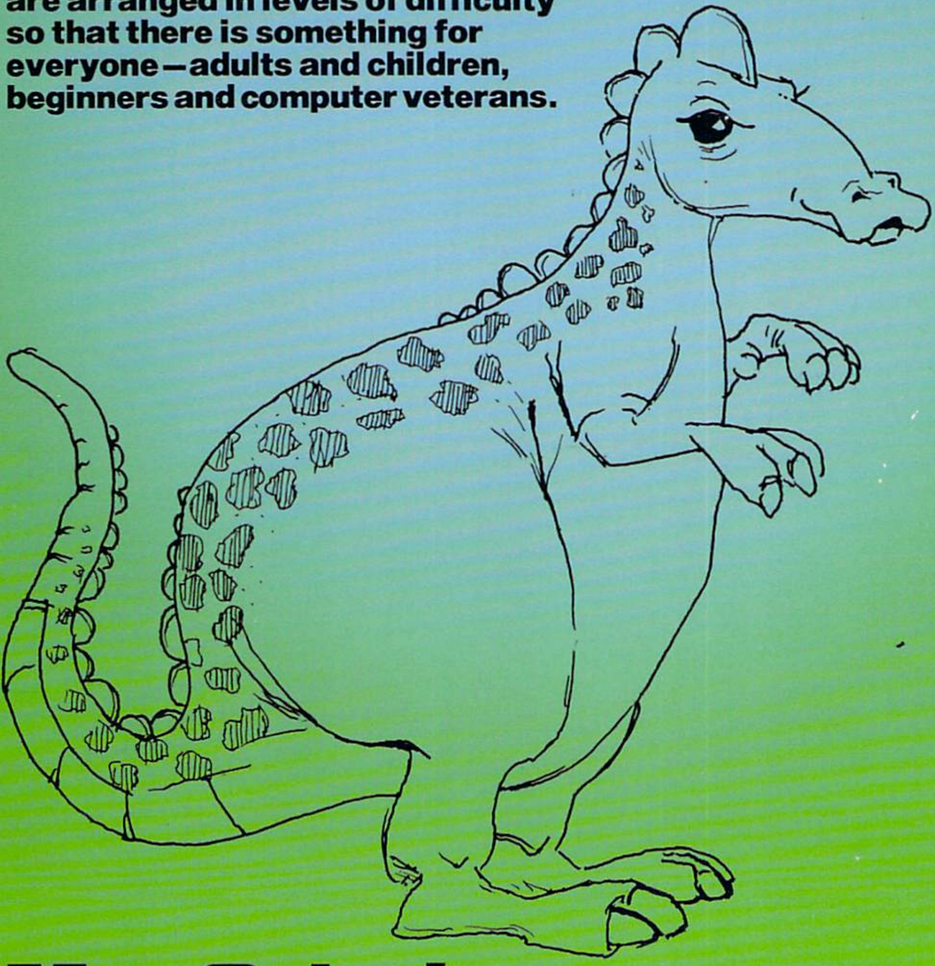
A REWARD BOOK

$12.95

PET GAMES AND RECREATIONS

A variety of challenging and entertaining diversions for you and your computer! The games are arranged in levels of difficulty so that there is something for everyone—adults and children, beginners and computer veterans.



Mac Oglesby
Len Lindsay
Dorothy Kunkin

PET Games and Recreations

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Also, many thanks to Pat Cleland, for helping us to get it all together.

PET Games and Recreations

Chapter 1

How to Use This Book for Fun and Learning

Welcome to the world of PET Games and Recreations. Your Playmasters, Mac Oglesby and Len Lindsay, have invented, imagined, and adapted a mixed bag of old and new games for your enjoyment and enlightenment. This book is designed to provide diversion for readers of all ages and occupations, in the home or in the classroom. We've arranged the entertainment in a way that we hope will enable you to select what you like and to develop your own logical learning path through the book. Of course, we also encourage you to try the other alternative: start anywhere and play away!

THE GAMES

We organized the games and recreations into five categories: plan-ahead games, games of deductive reasoning, games of chance, language and counting skills games, and the recreations.

The games within each category proceed consecutively from least difficult to most difficult. In many cases, you can control the complexity of the game by taking advantage of the user options provided. Six- to eight-year-olds can comfortably begin with the first games in each chapter. Conversely, all the games are designed to be fun for everybody. If you're an adult, you can still enjoy *Qwert, Stars,* and other beginner-level games. And many younger readers are more than capable of tackling the challenges that lie ahead.

As a rule-of-thumb, we divided the games into three levels of difficulty: A for (relatively) easy; B for medium difficulty; and C for the brainstretchers. Use these evaluations to help gauge your progress through the book as your game-playing skills develop—and don't take it too seriously.

The *Plan-Ahead Games* test your ability to plan out strategies with which to meet your objectives. Your ability to play well depends on your capacity to think ahead. Every move has consequences—some of which won't become apparent until several moves later. These games resemble chess in the sense that you can't win by fighting skirmishes. You have to work out a battle plan. One of the many challenges that these games offer is that winning is only part of the fun. There's always a better strategy you can develop.

Games of Deductive Reasoning place you in the role of detective. You're given a certain amount of information. To win the game, you must use this information to work out the solution. These games will take you to the stars, set you in pursuit of a mythical beast, send you to outer space, and last but not least, test your potential as an apprentice spy-codebreaker.

Games of Chance are to give you some relaxation from all this exciting brainwork. Visit Las Vegas via your PET computer and gamble away all your hard-earned stakes. On the other hand, you may emerge the winner in this contest of good fortune between you and the computer.

Words and Numbers are games of counting and language skills. They're also fun. Make up your own crossword puzzle. If you have access to a printer, every player can take away his or her creation.

The *Recreations* are clever tricks your PET will perform for you, if you follow the Playmasters' instructions. Then sit back and watch your PET bounce balls and do wild and crazy things.

THE GAME WRITE-UPS

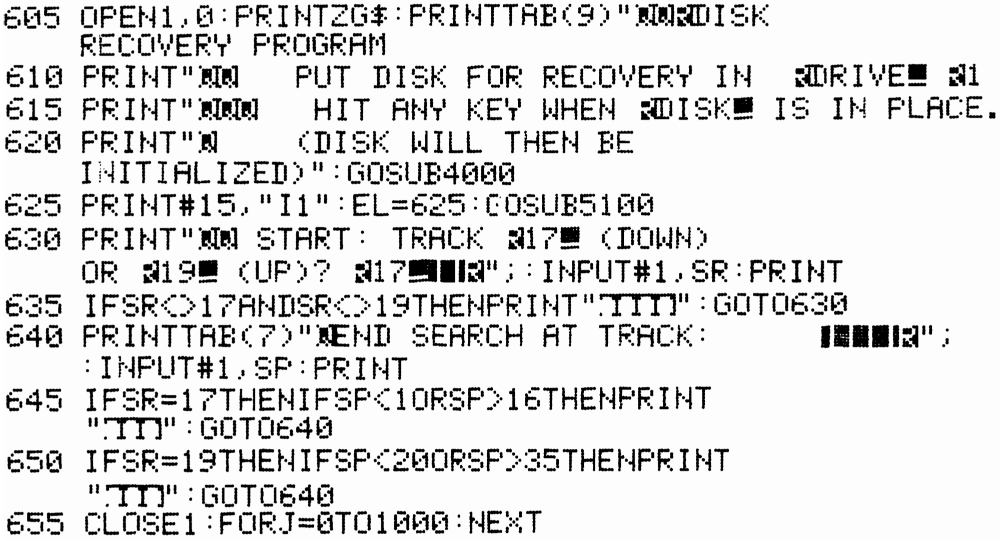
Each game listing is preceded by a short introduction. The purpose of these introductions is to give you the flavor of the game so you can decide which one you want to sample and when. We've also provided supplementary information to enhance your enjoyment of the game. Each game write-up includes:

- A short description of the game and your objective in playing it.
- A summary of instructions for play—what you do and what the computer does.
- The level of difficulty.
- The PET models you can use to play. These games were designed for all PET users. In some cases, however, you may have to modify the listings according to the model you own. For example, owners of PET 8K machines may have to leave the REM statements out of their listings to save memory for some of the longer games. Owners of the Business Model PET may have to adapt some of the graphics.

- What you can learn from the game—the particular skills, challenge, or subject matter the game involves.
- Some background on the game—its history and additional readings and variations.
- Where the Playmasters permit it, some strategy hints. We solemnly promise, however, never to give you more than hints. It's you, your brain, and the computer.

THE LISTINGS

Program listings in this book were prepared for reproduction by the staff of *COMPUTE*! magazine. We use an "intelligent" Spinwriter interface designed to allow us to obtain a high quality image while still handling the special "graphics" characters of the **PET**. Figure 1 shows a sample reproduction of "normal" **PET** printer output, using graphics characters, on a dot matrix printer. Figure 2 shows the same output after processing by our "intelligent" interface. Our method allows us to produce quite readable, evenly formatted program listings.



```
605 OPEN1,0:PRINTZG$:PRINTTAB(9)"▚▚▚DISK
    RECOVERY PROGRAM
610 PRINT"▚▚   PUT DISK FOR RECOVERY IN  ▚DRIVE▬ ▚1
615 PRINT"▚▚▚   HIT ANY KEY WHEN ▚DISK▬ IS IN PLACE.
620 PRINT"▚     (DISK WILL THEN BE
    INITIALIZED)":GOSUB4000
625 PRINT#15,"I1":EL=625:GOSUB5100
630 PRINT"▚▚ START:  TRACK ▚17▬ (DOWN)
    OR ▚19▬ (UP)? ▚17▬██▚";:INPUT#1,SR:PRINT
635 IFSR<>17ANDSR<>19THENPRINT"TTTT":GOTO630
640 PRINTTAB(7)"▚END SEARCH AT TRACK:      █▚██▚▚";
    :INPUT#1,SP:PRINT
645 IFSR=17THENIFSP<1ORSP>16THENPRINT
    "TTTT":GOTO640
650 IFSR=19THENIFSP<20ORSP>35THENPRINT
    "TTTT":GOTO640
655 CLOSE1:FORJ=0TO1000:NEXT
```

Figure 1. Standard **PET** Program Listing Containing Graphics and Cursor Control Symbols

```
605 OPEN1,Ø:PRINTZG$:PRINTTAB(9)"↓↓r̲DISK
    ¬ RECOVERY PROGRAM
610 PRINT"↓↓   PUT DISK FOR RECOVERY IN ¬
    ¬ r̲DRIVEr̂ r̲1
615 PRINT"↓↓↓   HIT ANY KEY WHEN r̲DISKr̂ ¬
    ¬IS IN PLACE.
620 PRINT"↓    (DISK WILL THEN BE ¬
    ¬INITIALIZED)":GOSUB4ØØØ
625 PRINT#15,"I1":EL=625:GOSUB51ØØ
630 PRINT"↓↓ START: TRACK r̲17r̂ (DOWN) ¬
    ¬OR r̲19r̂ (UP)? r̲17r̂←←r̲";:INPUT#1,
    ¬SR:PRINT
635 IFSR<>17ANDSR<>19THENPRINT"↑↑↑↑":
    ¬GOTO63Ø
640 PRINTTAB(7)"↓END SEARCH AT TRACK:
    ¬     ←←←←r̲";:INPUT#1,SP:PRINT
645 IFSR=17THENIFSP<1ORSP>16THENPRINT"↑↑
    ¬↑":GOTO64Ø
650 IFSR=19THENIFSP<2ØORSP>35THENPRINT"↑
    ¬↑↑":GOTO64Ø
655 CLOSE1:FORJ=ØTO1ØØØ:NEXT
```

Figure 2. Program Segment From Figure 1 After Formatting for Reproduction

Figure 3 shows the translation table for cursor control characters. These will appear, embedded in the source code of listings, as the symbol shown.

```
h̲=HOME          , ĥ=CLEAR SCREEN
↓=DOWN CURSOR   , ↑=UP CURSOR
→=RIGHT CURSOR, ←=LEFT CURSOR
r̲=REVERSE       , r̂=REVERSE OFF
```

Figure 3. Cursor Control Characters

Many of the programs in this book contain a line where a string variable is set equal to a bunch of DELETES. To set ZZ$ equal to forty DELETES:

- first, type ZZ$="
- second, type one delete (the quotation mark will disappear)
- third, type a second quotation mark
- fourth, press the insert key 40 times

- fifth, press the delete key 40 times
- sixth, type a final quotation mark

Alternatively, this code does the same job:

```
FOR J9 = 1 to 4Ø: ZZ$ = ZZ$ + CHR$(2Ø): NEXT J9
```

The special graphics character set of the **PET** (the graphics characters or capital letters you obtain by shifting to "upper case") appear as the shifted symbol with an underbar. (See Figure 2.)

One final note, and you're ready to go:

- The "∼", where encountered in program listings, represents the backarrow character of the PET, and the "¬" is used in our listings in two ways. It serves as a flag to indicate the *beginning* of a continuation line (a line we've broken entirely for formatting purposes), and also appears as the *last character* of any line that ends with a space. By attending to this flag, you can tell how many blank spaces need to be inserted while keying in a line. Remember, "¬ " is only a flag, e.g., it is not part of the actual program itself; so when you encounter it, use it as a reminder that the line you're keying in "keeps going."

BASIC FOR BEGINNERS

Our games book can be used as a companion piece with beginning BASIC books. Have fun while you learn the language. As your programming skills develop, analyze the listings to see how our two Playmasters put them together. Add your own embellishments for your private playing enjoyment.

There are a number of excellent Beginning BASIC books. We recommend *PETBASIC I: Training Your PETComputer* by Ramon Zamora, Bob Albrecht, and Bill Scarvie (Reston, Virginia: Reston Publishing Company, Inc., 1981). If you're ready to explore into the further reaches of computer science, however, proceed to our Honorary C.W.S. Degree.

SPECIAL GUEST LECTURES

Exclusive Feature for Readers of *PET Games Recreations*:

Professor Wacko's Lecture Series
on Computer Wacko Science (C.W.S.)

These lectures are extracurricular extravaganzas into the inner workings of your PET and PET BASIC. Only those with a sense of humor need apply! Dr. Wacko shows you how to POKE around inside your PET, make question marks and cursors disappear, ride the Loop-de-Loop, and purposely make mistakes, culminating in planned chaos and confusion.

GAMES BIBLIOGRAPHY

Games are as old as the human race. If you're interested in pursuing their make-up and history, we've provided a bibliography of additional reading on games in general and some of our games in particular. This bibliography is far from all-inclusive. We've tried to include some interesting background reading and reference works on the genesis of games.

Now—LET THE GAMES BEGIN!

A Note About COMPUTE! Magazine:

COMPUTE! is a monthly magazine that presents application articles, programs, and other useful information to owners and users of 6502 microprocessor-based computers. Our emphasis is one of helping brand new beginners, as well as experienced users. U.S. subscription price is $20. Address inquiries to *COMPUTE*! Magazine, P.O. Box 5406, Greensboro, NC 27403

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COMPUTE! magazine and its staff are not responsible for the accuracy of the programs, or any errors or omissions in the listings of same.

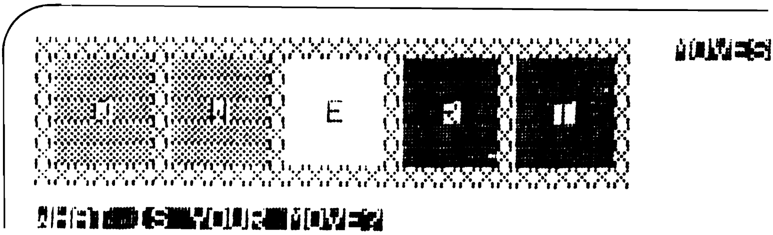
Plan-Ahead Games

Qwert

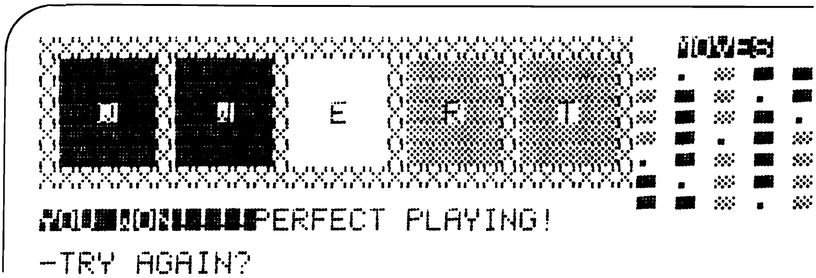
by Len Lindsay

Qwert is a tantalizing little puzzle with which to begin your PET play.

You're given five boxes in a row:



You win when you've reversed their order to look like:



```
[illegible]PERFECT PLAYING!
-TRY AGAIN?
```

Here's how: This puzzle is based on the keys that move your pieces. These are:

Q W E R T

To move the first box on your screen, hit the "Q" key. To move the second box, hit the "W" key. Need we say more? (By now, you'll have figured out how Len got the name for this game.)

Here's the catch—at any given time, there's only one blank box on the screen, whose location shifts as you play the game. You can only move a piece into this blank space by jumping over another piece into the blank space or by moving your piece into the blank space next to it. It's not hard to win—the challenge is to win in the least number of moves: 8 (eight) moves. Your PET will reward you by displaying:

"PERFECT PLAYING!"

on your screen.

For your convenience, your past moves are recorded graphically on the screen in the upper right-hand corner. Illegal moves are simply ignored—just try again.

To evaluate your puzzle-playing potential:

GENIUS: 5 (five) minutes or less
EXCELLENT: 10 (ten) minutes or less
AVERAGE: 20 (twenty) minutes or less.

You can play this game on all PET models, including 80-column machines. However, owners of *business models* may have to substitute some of the graphic characters. As an example:

GRAPHICS FOR BUSINESS MODELS

Shift & is a gray box. Substitute #.
Shift " is a half-white box. Substitute shift Q.
Shift (is a half-gray box. Substitute *.

Qwert is an A-level game.

```
Ø REM*** WORKS ON ORIGINAL PET 2ØØ1-8,
      ¬ NEW PET/CBM, BASIC 4.Ø, & CBM ¬
      ¬8Ø32 & 8Ø16
1 REM***QWERT - PUZZLE
2 REM***ORIGINAL PROGRAM
3 REM***(C) 198Ø
4 REM***LEN LINDSAY
5 REM***Ø1-3Ø-8Ø
9 REM***USES MAIN SUBROUTINES 1Ø1ØØ,
      ¬ 1Ø3ØØ
1Ø POKE59468,12←53272,21 (on 64)
15 XQ=RND(-TI):XQ=Ø
2Ø PRINT"ĥ";
5Ø REM
51 ZZ$="
      ¬":REM 4Ø DELETE
52 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":
      ¬REM 23 DOWN
54 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→":REM 4Ø RIGHT
56 ZL$="←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←":
      ¬REM 3Ø LEFT
58 ZS$="                              ":
      ¬REM 3Ø SPACE
6Ø P$(Ø)="     ←←←←←↓     ←←←←←↓  →  ¬
      ¬←←←←←↓     ←←←←←↓     r̂"
62 P$(1)="&&&&&←←←←←↓&&&&&←←←←←↓&&→&&←←←
      ¬←←↓&&&&&←←←←←↓&&&&&"
64 P$(2)="r̲"+P$(Ø)
66 RM$="h̲"+LEFT$(ZD$,8)+ZS$+ZL$
9Ø PRINT"↓DO YOU NEED INSTRUCTIONS?"
92 GOSUB1Ø13Ø
94 IFXA$="Y"THENGOSUB5ØØØ:GOTO1ØØ
96 IFXA$<>"N"THEN92
1ØØ P(1)=1:P(2)=1:P(3)=Ø:P(4)=2:P(5)=2:
      ¬REM SET UP START POSITIONS
1Ø5 P(Ø)=3:P(6)=3:P(7)=3:REM BORDER ¬
      ¬POSITIONS
11Ø MV=Ø:REM INIT
13Ø GOSUB6ØØØ:REM DRAW BOARD
14Ø GOSUB7ØØØ:REM DRAW PIECES
2ØØ PRINTRM$;"r̲WHAT IS YOUR MOVE?r̂";
2Ø2 GOSUB1Ø13Ø
```

```
210 XM$="QWERT":GOSUB10300
220 IFXF=0THEN202
230 P=P(XF):REM PIECE TO MOVE?
240 IFP=0THEN200
250 GOSUB1000:REM CHECK MOVE & MOVE IT
260 GOTO200:REM ASK FOR NEXT MOVE
1000 IFP(XF+1)=0THENP(XF+1)=P:P(XF)=0:
      ¬GOTO3000
1010 IFP(XF+2)=0THENP(XF+2)=P:P(XF)=0:
      ¬GOTO3000
2000 IFP(XF-1)=0THENP(XF-1)=P:P(XF)=0:
      ¬GOTO3000
2010 IFXF>1THEN IF P(XF-2)=0THENP(XF-2)=
      ¬P:P(XF)=0:GOTO3000
2020 RETURN
3000 MV=MV+1:REM INCREMENT MOVE
3005 GOSUB7000:REM DRAW PIECES
3020 IFP(1)=2ANDP(2)=2ANDP(4)=1ANDP(5)=1
      ¬THEN8000:REM WINNER
3025 IFMV>22THENPRINTRM$"YOU SEEM LOST ¬
      ¬- TRY AGAIN?";:GOTO8010
3030 GOSUB9000
3040 PRINT"h̲"+LEFT$(ZD$,MV)+LEFT$(ZR$,
      ¬31)+MV$
3099 RETURN
4999 END
5000 PRINT"ĥ";:REM INSTRUCTIONS
5010 PRINT"WELCOME TO r̲QWERTr̂ - A ¬
      ¬PUZZLE FOR YOUR"
5020 PRINT"↓THOUGHTS. YOU HAVE 5 BOXES ¬
      ¬IN A LINE:"
5030 PRINT"↓&̲ &̲ W̲ r̲ r̂ r̲ r̂  - THIS IS ¬
      ¬THE STARTING"
5040 PRINT"↓POSITION. YOU TRY TO ¬
      ¬REVERSE THEIR"
5050 PRINT"↓ORDER FOLLOWING THESE RULES:
      ¬↓↓↓↓"
5060 GOSUB10100
5100 PRINT"ĥYOU CAN SLIDE ANY MARKER TO ¬
      ¬AN ADJACENT"
5110 PRINT"↓BLANK SPOT. OR YOU MAY JUMP ¬
      ¬OVER ONE"
```

```
5120 PRINT"↓MARKER ONTO A BLANK. THE ¬
      ¬FIVE BOXES"
5130 PRINT"↓HOLDING THE MARKERS ARE ¬
      ¬REPRESENTED BY"
5140 PRINT"↓THESE FIVE KEYS : r̲Qr̂ r̲Wr̂ ¬
      ¬r̲Er̂ r̲Rr̂ r̲Tr̂."
5150 PRINT"↓THUS YOU SEE WHERE THE NAME ¬
      ¬CAME FROM."
5160 PRINT"↓TO MOVE THE SECOND MARKER ¬
      ¬YOU WOULD"
5170 PRINT"↓HIT THE r̲Wr̂ KEY. YOU WIN ¬
      ¬WHEN THE"
5180 PRINT"↓MARKERS LOOK LIKE:  r̲ r̂ r̲ r̂ ¬
      ¬W̲ &̲ &̲↓↓↓↓"
5190 GOSUB10100
5200 PRINT"ĥBY THE WAY, YOU SHOULD BE ¬
      ¬ABLE TO DO IT"
5210 PRINT"↓IN ONLY 8 MOVES."
5220 PRINT"↓YOU ARE A r̲GENIUSr̂ IF YOU ¬
      ¬GET IT IN"
5230 PRINT"↓5 MINUTES OR LESS."
5240 PRINT"↓YOU DID r̲EXCELLENTr̂ IF YOU ¬
      ¬GET IT IN"
5250 PRINT"↓10 MINUTES."
5260 PRINT"↓20 MINUTES IS ABOUT ¬
      ¬AVERAGE.↓↓↓↓"
5270 GOSUB10100
5299 RETURN
6000 PRINT"ĥ";:REM DRAW BOARD
6010 FORX=1TO31:PRINT"X";:NEXTX
6020 PRINT"  r̲MOVESr̂"
6030 FORY=1TO5
6040 :FORX=1TO5
6050 ::PRINT"X     ";
6060 :NEXTX
6070 :PRINT"X"
6080 NEXTY
6090 FORX=1TO31:PRINT"X";:NEXTX
6091 PRINT"h̲↓↓↓→→→Q→→→→→W→→→→→E→→→→→R→→→
      ¬→→T"
6095 PRINT
6099 RETURN
```

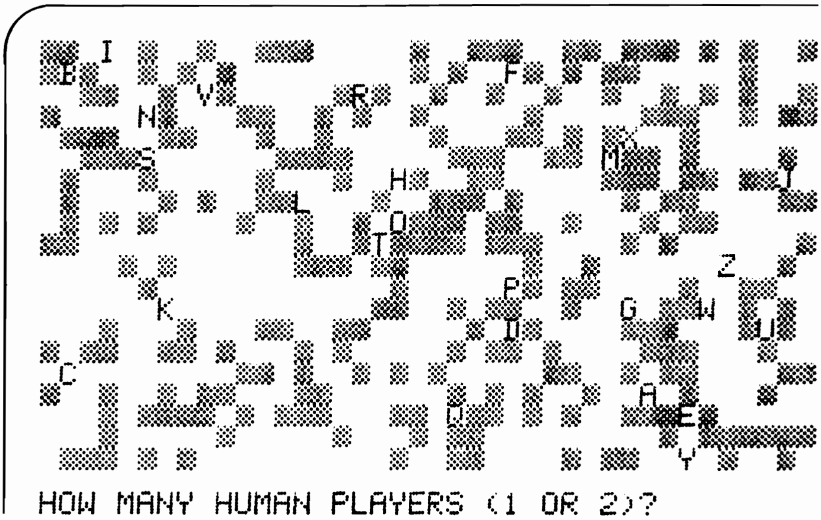
```
 7000 FORX=0TO4
 7010 :PRINT"h̲↓";
 7020 :PRINTLEFT$(ZR$,(X*6)+1);
 7030 :PRINTP$(P(X+1))
 7040 NEXTX
 7099 RETURN
 8000 PRINTRM$;"r̲YOU WON!!!!r̂";
 8003 IFMV=8THENPRINT"PERFECT PLAYING!↓"
 8006 PRINT"-TRY AGAIN?";
 8010 GOSUB10130
 8020 IFXA$="Y"THENRUN
 8030 END
 9000 FORQQ=1TO5
 9010 :IFP(QQ)=0THENMV$=MV$+" ."
 9020 :IFP(QQ)=1THENMV$=MV$+" (̲"
 9030 :IFP(QQ)=2THENMV$=MV$+" "̲"
 9040 NEXT QQ
 9050 MV$=RIGHT$(MV$,9)
 9099 RETURN
 10100 IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
       ¬CONTINUE r̂" : REM GET 1 CHARACTER
 10120 IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
 10130 GETXA$:IFXA$>""THEN10130:REM ¬
       ¬CLEAR BUFFER
 10140 GETXA$:IFXA$=""THEN10140
 10150 XA=VAL(XA$)
 10199 XX$="":RETURN
 10300 XF=0:REM INITIALIZE FLAG - EDIT 1 ¬
       ¬CHARACTER
 10320 IFXM$=""THENXM$="YN":REM DEFAULT ¬
       ¬FOR YES OR NO
 10330 FORXX=1TOLEN(XM$)
 10340 :IFXA$=MID$(XM$,XX,1)THENXF=XX
 10350 NEXT
 10399 XM$="":XX=0:RETURN
READY.
```

Capture

by Mac Oglesby

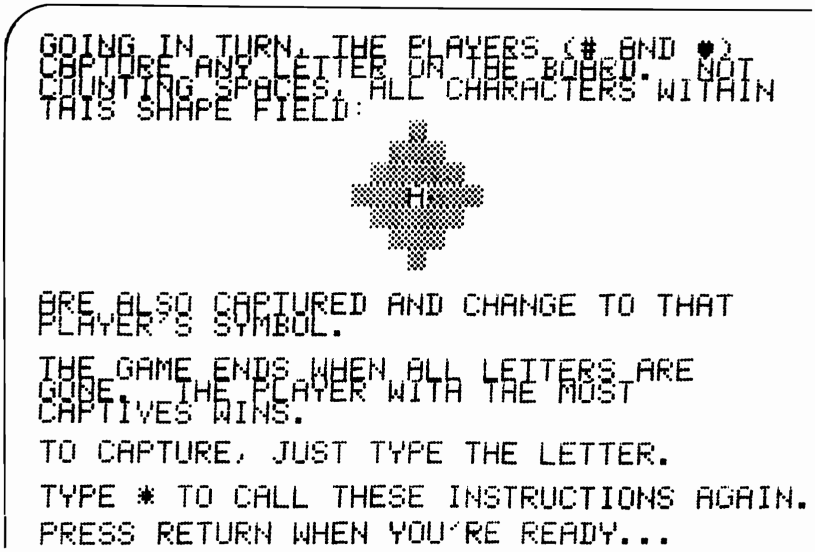
(A Game for One or Two Players)

The drama of *Capture* takes place on a playing field.



```
HOW MANY HUMAN PLAYERS (1 OR 2)?
```

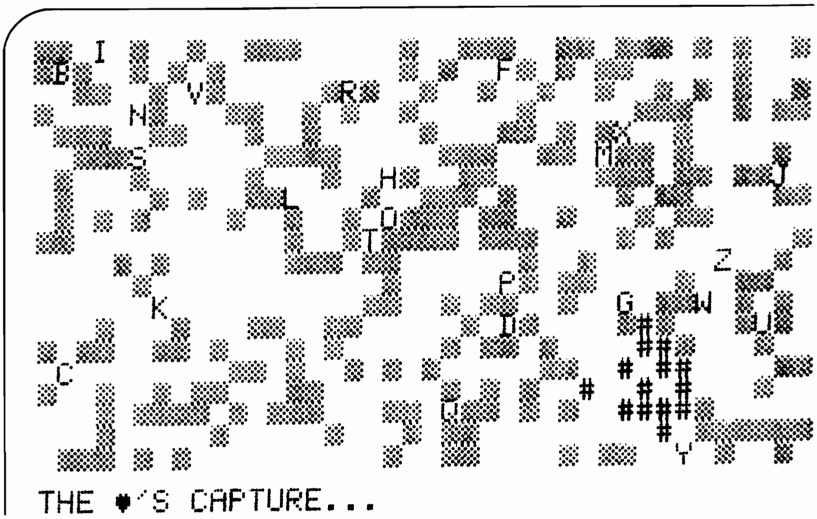
This field changes randomly with each game*. Your objective is to capture more of the playing field than your opponent, not counting the blank spaces. The limit of the space you can capture during each turn is a field shaped like this:



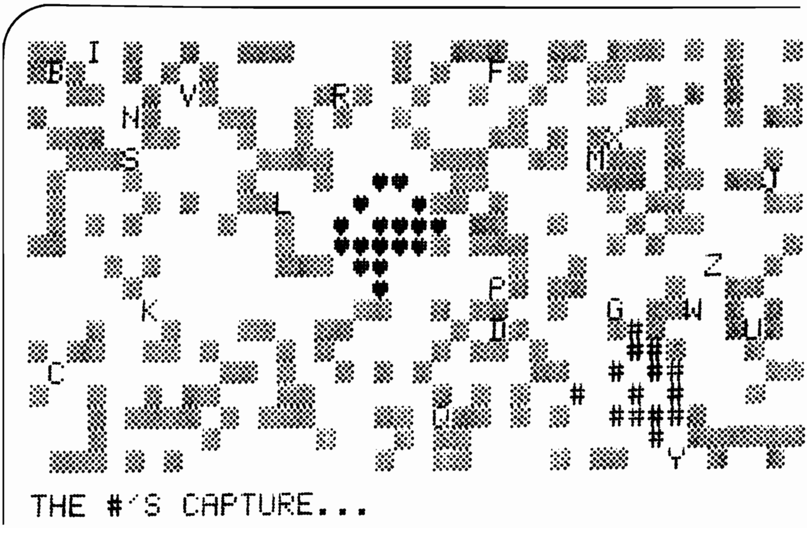
```
GOING IN TURN, THE PLAYERS (# AND ●)
CAPTURE ANY LETTER ON THE BOARD. NOT
COUNTING SPACES, ALL CHARACTERS WITHIN
THIS SHAPE FIELD:

                  H

ARE ALSO CAPTURED AND CHANGE TO THAT
PLAYER'S SYMBOL.

THE GAME ENDS WHEN ALL LETTERS ARE
GONE. THE PLAYER WITH THE MOST
CAPTIVES WINS.

TO CAPTURE, JUST TYPE THE LETTER.

TYPE * TO CALL THESE INSTRUCTIONS AGAIN.

PRESS RETURN WHEN YOU'RE READY...
```

*The REMarks at lines 8754-8758 will tell you how you can try again with the same playing field setup.

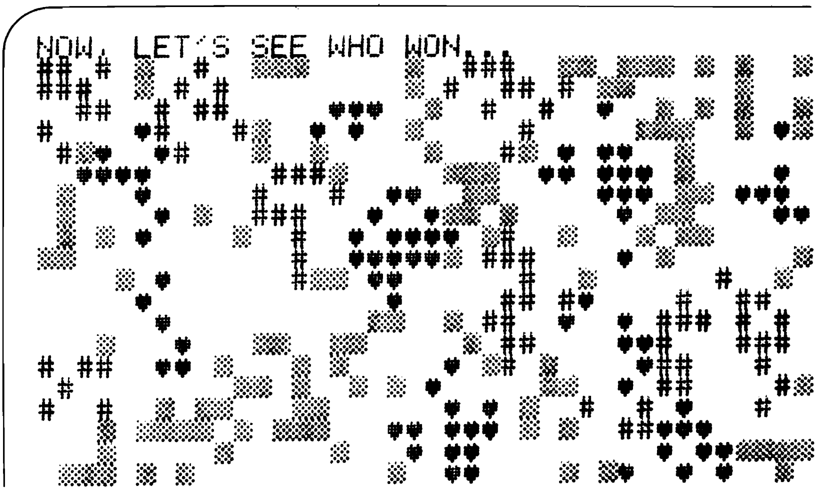
Each player in turn selects a letter from A to Z, corresponding to its spot on the screen. When you type in the letter you've selected, all symbols within its capture field change to *your* symbol (not counting the blank spaces). You've made a capture! For example, you choose the letter A on the playing field displayed in the illustration, and your symbol is #. The area you've captured is:


THE ♥'S CAPTURE...

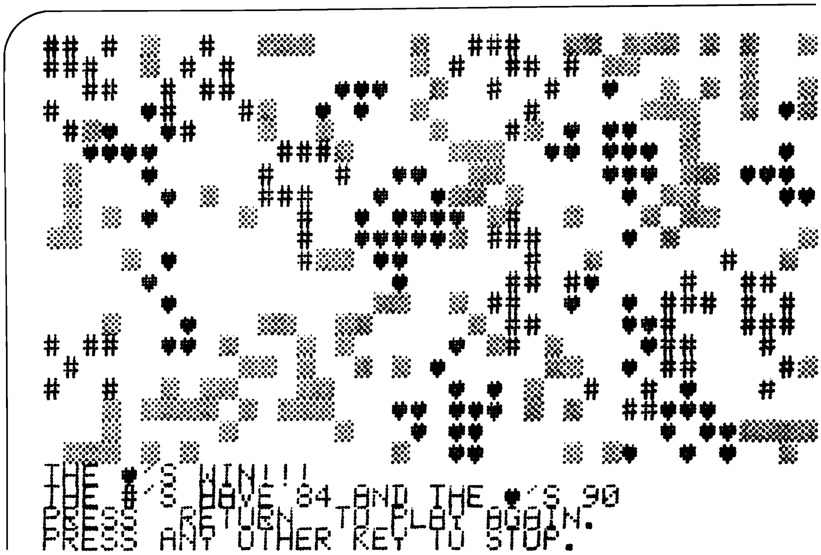
Letters are eliminated as the game progresses, and the game ends when all the letters have been used up. Your PET then counts the score and announces the winner.


THE #'S CAPTURE...

The key to winning is to always keep in mind the shape of the field that shows the area in which you can take captives. A smart move will either capture more than one letter for you or convert some of your opponent's symbols into your own. (Owners of *PET 8K* computers may want to eliminate REM lines from their listing in order to save memory.) This is a B-level game. Good luck!



```
NOW, LET'S SEE WHO WON...
```



```
THE ♥'S WIN!!!
THE #'S HAVE 84 AND THE ♥'S 90
PRESS RETURN TO PLAY AGAIN.
PRESS ANY OTHER KEY TO STOP.
```

```
1ØØ REM  NAME:  CAPTURE
1Ø5 REM
11Ø REM (C) MAC OGLESBY 2/2Ø/78
112 REM
115 REM    LAST REVISION:  3/3Ø/8Ø
117 REM
12Ø REM  A GAME FOR 1 OR 2 PLAYERS.
13Ø REM  COPYRIGHT 1978 BY MAC OGLESBY
14Ø REM  PERMISSION GRANTED TO USE,
15Ø REM  BUT NOT TO SELL.
16Ø REM
17Ø REM
1ØØØ REM INITIATE
1Ø1Ø PRINT"ĥ";:FOR J=1 TO 18:PRINT "→";:
      ¬NEXT J
1Ø2Ø PRINT"S̲↓←←S̲S̲S̲↓←←←←S̲S̲S̲S̲S̲↓←←←←←←S̲S̲S̲S̲S̲
      ¬S̲S̲↓←←←←←←S̲S̲S̲S̲S̲↓←←←←S̲S̲S̲↓←←S̲"
1Ø3Ø PRINT"↓↓WELCOME TO↓↓↓  C A P T U R ¬
      ¬E"
1Ø4Ø PRINT"↓↓↓↓WANT INSTRUCTIONS (YES ¬
      ¬OR NO)?";:GOSUB 1ØØØØ
1Ø5Ø IF XA$<>"Y" THEN 11ØØ
1Ø6Ø X=-1
1Ø7Ø PRINT"ĥ↓↓↓↓↓↓↓↓↓↓"
1Ø8Ø PRINT"I'LL PRINT INSTRUCTIONS ¬
      ¬AFTER I MAKE"
1Ø9Ø PRINT"↓↓THE PLAYING BOARD..."
1Ø95 FOR J=1 TO 5ØØØ: NEXT J
11ØØ DIM D$(2Ø),E$(2Ø),L(26),M(26),
      ¬R(25),C(25),P$(2)
111Ø P$(1)="#":P$(2)="S̲"
114Ø FOR J=1 TO 25:READ R(J),C(J):NEXT J
115Ø DATA -3,Ø,-2,-1,-2,Ø,-2,1
1155 DATA -1,-2,-1,-1,-1,Ø,-1,1,-1,2
116Ø DATA Ø,-3,Ø,-2,Ø,-1,Ø,Ø,Ø,1,Ø,2,Ø,3
1165 DATA 1,-2,1,-1,1,Ø,1,1,1,2
117Ø DATA 2,-1,2,Ø,2,1,3,Ø
118Ø A$="":FOR J=1 TO 4Ø:A$=A$+" ":
      ¬NEXT J
119Ø FOR J=1 TO 2Ø:D$(J)=A$:NEXT J
1195 PRINT"ĥ";
12ØØ FOR J=1 TO 3ØØ
```

```
1210 R8=1+INT(2Ø*RND(1)):C8=1+INT(4Ø*RND
      ¬(1))
122Ø P8=32767+C8+4Ø*(R8-1):IF PEEK(P8)<>
      ¬32 THEN 121Ø
123Ø C$="&":IF J>26 THEN POKE P8,1Ø2
124Ø IF J<27 THEN L(J)=1ØØ*R8+C8:
      ¬C$=CHR$(J+64):POKE P8,J:REM ¬
      ¬M(J)=L(J)
125Ø GOSUB 6ØØØ
126Ø NEXT J
13ØØ REM FOR J=1 TO 2Ø:E$(J)=D$(J):
      ¬NEXT J
14ØØ IF X<Ø THEN GOSUB 9ØØØ
15ØØ DN$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
151Ø REM
155Ø ZZ$="
      ¬":REM LINE 155Ø ZZ$=4Ø ¬
      ¬DEL
156Ø RT$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→→"
2ØØØ T=2
21ØØ PRINT "h";LEFT$(DN$,21);
211Ø PRINT "HOW MANY HUMAN PLAYERS (1 ¬
      ¬OR 2)?"
212Ø GOSUB 1ØØØØ
213Ø IF XA$<>"1" AND XA$<>"2" THEN 211Ø
214Ø PL=VAL(XA$)
215Ø IF PL=2 THEN 3ØØØ
22ØØ PRINT "h";LEFT$(DN$,21);"OK,
      ¬ I'LL PLAY THE #'S"
221Ø PRINT "↓WHO GOES FIRST (1=COMPUTER ¬
      ¬ 2=YOU)"
222Ø GOSUB 1ØØØØ
223Ø IF XA$<>"1" AND XA$<>"2" THEN ¬

224Ø T=3-VAL(XA$)
3ØØØ REM *** COMPUTER'S MOVE
31ØØ T=3-T
311Ø IF PL=2 OR T=2 THEN 4ØØØ
313Ø GOSUB 1Ø7ØØ:PRINT "PLEASE BE ¬
      ¬PATIENT WHILE I THINK...↓"
314Ø E=Ø
```

```
3160 FOR J=1 TO 26
3200 IF L(J)=0 THEN 3900
3210 PRINT CHR$(J+64);" ";
3220 R=INT(L(J)/100):C=L(J)-R*100
3240 Q=0
3250 FOR K=1 TO 25
3260 R1=R+R(K):IF R1>20 OR R1<1 THEN ¬
      ¬3400
3270 C1=C+C(K):IF C1>40 OR C1<1 THEN ¬
      ¬3400
3280 X$=MID$(D$(R1),C1,1):IF X$=" " OR ¬
      ¬X$="#" THEN 3400
3290 Q=Q+1
3400 NEXT K
3500 IF Q>E THEN M$=CHR$(J+64):E=Q:
      ¬GOTO 3900
3510 IF Q=E THEN M$=M$+CHR$(J+64)
3900 NEXT J
3910 X=1+INT(LEN(M$)*RND(1))
3920 Z$=MID$(M$,X,1):X=ASC(Z$)-64
3930 GOSUB 10600
3940 GOSUB 10700:PRINT "I CAPTURE  ";Z$:
      ¬GOTO 4300
4000 REM *** HUMAN'S MOVE
4110 PRINT"THE ";P$(T);"'S CAPTURE...";
4200 GOSUB 10000
4210 IF XA$="*" THEN GOSUB 9000:
      ¬GOTO 4110
4240 X=ASC(XA$)-64:IF X<1 OR X>26 THEN ¬
      ¬4260
4250 IF L(X)<>0 THEN 4300
4255 GOSUB 10600:GOSUB 10700:PRINT ¬
      ¬"THAT LETTER HAS BEEN CAPTURED!↓":
      ¬GOTO 4110
4260 GOSUB 10600:GOSUB 10700:PRINT "YOU ¬
      ¬CONFUSE ME.  TYPE * FOR HELP.↓"
4290 GOTO 4110
4300 R=INT(L(X)/100):C=L(X)-R*100
4390 C$=P$(T)
4400 FOR J=1 TO 25
4410 R8=R+R(J):IF R8<1 OR R8>20 THEN ¬
      ¬4500
```

```
4420 C8=C+C(J):IF C8<1 OR C8>4Ø THEN ¬
      ¬45ØØ
443Ø Z$=MID$(D$(R8),C8,1):IF Z$=" " ¬
      ¬THEN 45ØØ
444Ø X=ASC(Z$):IF X>64 AND X<91 THEN ¬
      ¬L(X-64)=Ø
445Ø GOSUB 6ØØØ
45ØØ NEXT J
452Ø GOSUB 7ØØØ:X=Ø
46ØØ FOR J=1 TO 26:X=X+L(J):NEXT J
461Ø IF X=Ø THEN 8ØØØ
47ØØ GOTO 3ØØØ
6ØØØ REM *** UPDATE BOARD
61ØØ IF C8=1 THEN D$(R8)=C$+RIGHT$(D$(R8
      ¬),39):RETURN
62ØØ IF C8=4Ø THEN D$(R8)=LEFT$(D$(R8),
      ¬39)+C$:RETURN
63ØØ D$(R8)=LEFT$(D$(R8),C8-1)+C$+RIGHT$
      ¬(D$(R8),4Ø-C8):RETURN
7ØØØ REM *** PRINT BOARD
7Ø1Ø PRINT "h";
71ØØ FOR J=1 TO 2Ø:PRINT D$(J);:NEXT J
72ØØ PRINT:RETURN
8ØØØ REM *** END
81ØØ PRINT"ĥNOW, LET'S SEE WHO WON..."
82ØØ H1=Ø:H2=Ø
83ØØ FOR J=1 TO 2Ø
831Ø PRINT D$(J);
832Ø FOR K=1 TO 4Ø
833Ø A$=MID$(D$(J),K,1)
834Ø IF A$="#" THEN H1=H1+1:GOTO 84ØØ
835Ø IF A$="S" THEN H2=H2+1
84ØØ NEXT K
85ØØ NEXT J
86ØØ IF H1<>H2 THEN 87ØØ
862Ø PRINT"TIE GAME!!! EACH HAS";H1;"CAP
      ¬TIVES.":GOTO 872Ø
87ØØ PRINT"THE ";P$((SGN(H2-H1)+3)/2);"'
      ¬S WIN!!!"
871Ø PRINT"THE #'S HAVE";H1;"AND THE ¬
      ¬S'S";H2
872Ø PRINT"PRESS  RETURN  TO PLAY ¬
      ¬AGAIN."
```

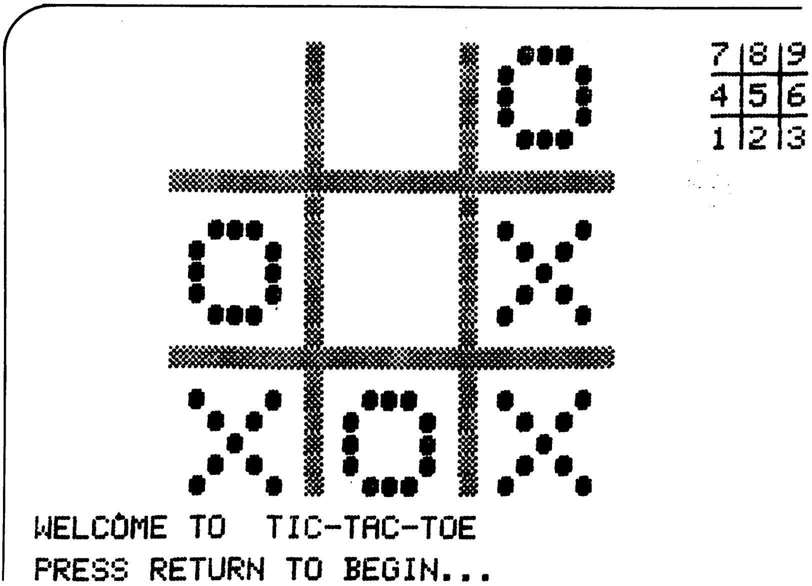
```
873Ø PRINT "PRESS ANY OTHER KEY TO ¬
      ¬STOP."
874Ø GOSUB 1ØØØØ
875Ø IF ASC(XA$)=13 THEN PRINT "ĥRUN":
      ¬RUN
8752 PRINT "ĥBYE FOR NOW...":END
8754 REM LINES 876Ø-884Ø ALLOW FOR ¬
      ¬REPLAY WITH SAME BOARD SETUP IF ¬
      ¬THE CODE
8756 REM FOLLOWING THE REMS IN LINE ¬
      ¬124Ø AND LINE 13ØØ IS RESTORED.
8758 REM MY 8K PET RUNS OUT OF MEMORY
876Ø PRINT"ĥ↓↓↓↓↓↓↓↓→→→→→→→→1 = SAME ¬
      ¬SETUP"
877Ø PRINT"↓→→→→→→→→→2 = NEW BOARD↓↓"
878Ø PRINT"PLEASE TYPE 1 OR 2... ";
879Ø GOSUB 1ØØØØ
88ØØ IF XA$="2" THEN PRINT "ĥRUN":RUN
881Ø IF XA$<>"1" THEN PRINT:GOTO 878Ø
882Ø FOR J=1 TO 2Ø:D$(J)=E$(J):NEXT J
883Ø FOR J=1 TO 26:L(J)=M(J):NEXT J
884Ø GOSUB 7ØØØ:GOTO 2ØØØ
9ØØØ REM *** RULES
9Ø1Ø PRINT "ĥ";
91ØØ PRINT "GOING IN TURN, THE PLAYERS ¬
      ¬(# AND S)"
911Ø PRINT "CAPTURE ANY LETTER ON THE ¬
      ¬BOARD.  NOT"
912Ø PRINT "COUNTING SPACES, ALL ¬
      ¬CHARACTERS WITHIN"
9125 PRINT "THIS SHAPE FIELD:";
913Ø PRINT "  ↓&↓←←&&&↓←←←←&&&&&↓←←←←←←&
      ¬&&A&&&↓←←←←←←←&&&&&↓←←←←&&&↓←←&"
914Ø PRINT "↓ARE ALSO CAPTURED AND ¬
      ¬CHANGE TO THAT"
915Ø PRINT "PLAYER'S SYMBOL."
916Ø PRINT
917Ø PRINT "THE GAME ENDS WHEN ALL ¬
      ¬LETTERS ARE"
919Ø PRINT "GONE.  THE PLAYER WITH THE ¬
      ¬MOST"
92ØØ PRINT "CAPTIVES WINS.":PRINT
```

```
 9220 PRINT "TO CAPTURE, JUST TYPE THE ¬
        ¬LETTER."
 9230 PRINT "↓TYPE * TO CALL THESE ¬
        ¬INSTRUCTIONS AGAIN."
 9300 PRINT:PRINT "PRESS RETURN WHEN ¬
        ¬YOU'RE READY...";
 9400 GOSUB 10000
 9410 PRINT "ĥ":GOSUB 7000:RETURN
 10000 REM GET
 10300 GET XA$:IF XA$<>"" THEN 10300
 10310 GET XA$:IF XA$="" THEN 10310
 10400 GOSUB 10600
 10500 RETURN
 10600 PRINT "h̲";DN$;RT$;ZZ$;ZZ$;ZZ$;ZZ$
 10610 RETURN
 10700 PRINT "h̲";LEFT$(DN$,21);
 10710 RETURN
READY.
```

Tic Tac Toe

by Mac Oglesby

This ancient and popular game may some day be found on the walls of caves—who knows how many hundreds of years people have been playing it! King Tut, Socrates, and Queen Elizabeth I would all probably recognize:



```
7|8|9
4|5|6
1|2|3

WELCOME TO  TIC-TAC-TOE
PRESS RETURN TO BEGIN...
```

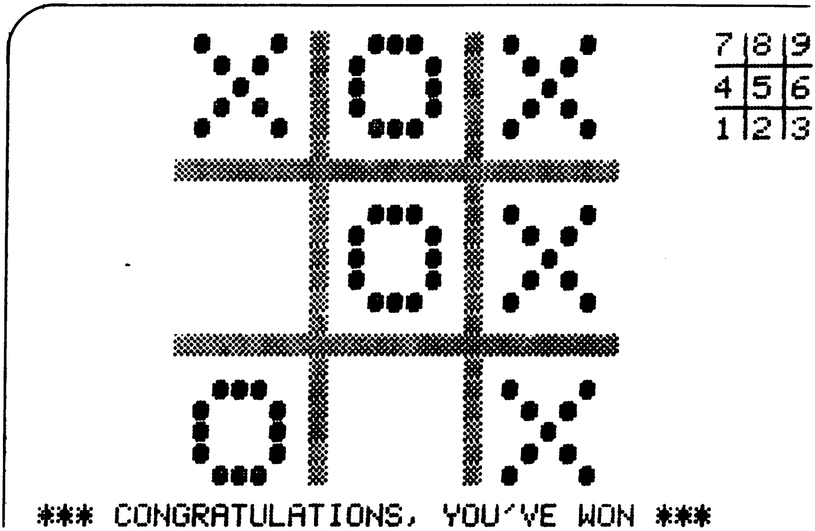
This simple little game really isn't so simple. Charles Babbage, one of the fathers of computer science, developed six machines so he could simulate *Tic Tac Toe*. It's been the subject of numerous other strategies and computer simulations. Some programmers have even gone out of their way to develop versions of *Tic Tac Toe* that only the computer can win.

We haven't been so cruel. Who goes first (you or the computer) is randomly decided, so you will have your chance to be the victor. Best play for both opponents is always to play to a draw. However, if you or the computer gets lazy, one of you will emerge the winner.

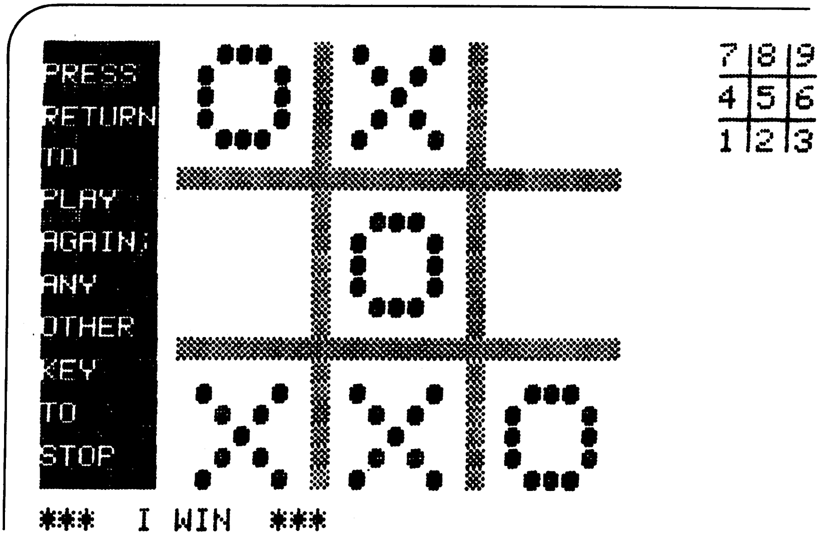
For a discussion of *Tic Tac Toe* strategy, and some imaginative variations such as *Toe Tac Tic*, see *Your Move* by David L. Silverman, New York, 1971. Donald D. Spencer, in *Game Playing with Compu-*

ters, New Jersey: Hayden, 1975 gives you the opportunity to write your own *Tic Tac Toe* program with personal touches.

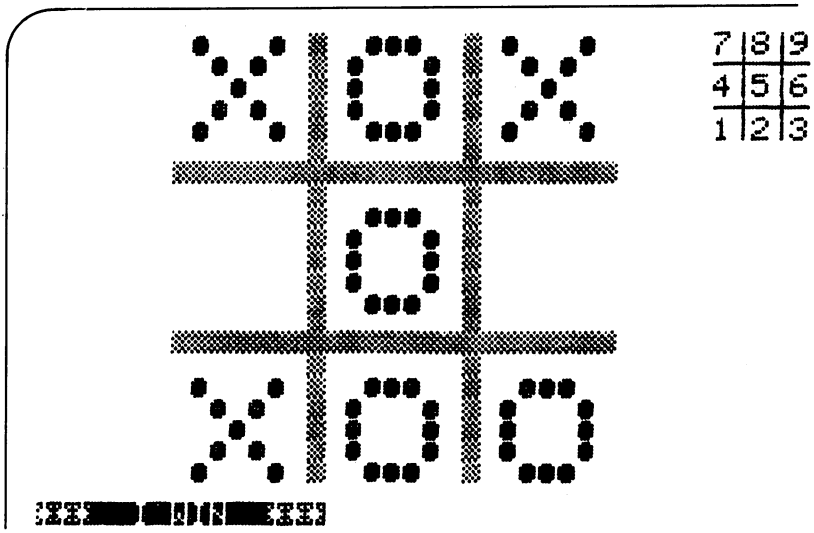
We've classified this game as Level B. Believe it or not, you're on your way to thinking like a chess player when you've mastered this. Mac's *Tic Tac Toe* is for all PETs, all ages, and for all playtimes. In case anyone needs reminding, some winning configurations are:



```
*** CONGRATULATIONS, YOU'VE WON ***
```



```
PRESS
RETURN
TO
PLAY
AGAIN;
ANY
OTHER
KEY
TO
STOP
*** I WIN ***
```



X	O	X
	O	
X	O	O

7	8	9
4	5	6
1	2	3

```
100 REM  NAME:  TICTACTOE
105 REM
110 REM (C) MAC OGLESBY   2/22/78
120 REM    (ADAPTED FROM A PUBLIC DO-
130 REM      MAIN PROGRAM WRITTEN BY
140 REM      TOM KURTZ AND JOHN KEMENY)
150 REM    LAST REVISION  12/17/79
160 REM
1000 REM *** INITIALIZATION
1010 POKE 59468,12: REM GRAPHICS MODE
1100 DIM T(8,3),U(9,4),C(9),B(9),Q(9),
      ¬V(9),C$(2),L(9)
1200 FOR P=1 TO 8: FOR I=1 TO 3
1210 : READ T(P,I)
1220 NEXT I: NEXT P
1230 DATA 7,8,9,4,5,6,1,2,3,7,4,1
1240 DATA 8,5,2,9,6,3,7,5,3,1,5,9
1300 FOR S=1 TO 9: FOR J=1 TO 4
1310 : READ U(S,J)
1320 NEXT J: NEXT S
1330 DATA 3,4,8,0,3,5,0,0,3,6,7,0
1340 DATA 2,4,0,0,2,5,7,8,2,6,0,0
1350 DATA 1,4,7,0,1,5,0,0,1,6,8,0
1400 C$(1)="Q↓Q↓Q↓Q↓Q←←←←←Q↑Q↑Q↑Q↑Q"
1410 C$(2)="→→Q←←Q←← ↓←Q↓←Q↓←Q↓QQQ↑Q←↑Q←
      ¬↑Q←←↑Q "
1500 FOR J=1 TO 9
1510 : READ L(J)
1520 NEXT J
1530 DATA 1608,1616,1624,808,816,824
1540 DATA 8,16,24
1600 B1$="              &       &"
1610 B2$="       &&&&&&&&&&&&&&&&&&&&&&&&
      ¬"
1650 B(1)=-1:B(3)=-1:B(6)=-1:B(2)=1:
      ¬B(4)=1:B(9)=1
1660 GOSUB 8000
1670 D$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
1700 PRINT "h";D$;
1710 PRINT "WELCOME TO  TIC-TAC-TOE"
1720 PRINT "↓PRESS RETURN TO BEGIN...";
1730 GOSUB 7000
```

```
1740 IF ASC(A$)<>13 THEN 1730
2000 REM *** HERE TO BEGIN GAME
2010 PRINT "ĥ";
2100 N=0
2110 FOR S=1 TO 9: C(S)=0: B(S)=0:
       ¬ NEXT S
2200 GOSUB 8000
2310 IF RND(1)>.5 THEN 2400
2320 PRINT "YOU MOVE FIRST.  ";
2330 GOTO 3000
2400 PRINT "I MOVE FIRST.  ";
2410 GOTO 5000
3000 REM *** PLAYER'S MOVE
3100 PRINT "YOUR MOVE...";
3110 GOSUB 7000
3300 M=VAL(A$): F=-1
3310 IF M=INT(M) AND M>0 AND M<10 THEN ¬
       ¬3400
3330 GOSUB 8800: GOTO 3800
3400 IF B(M)=0 THEN 4000
3410 GOSUB 8800
3500 PRINT "  THAT SQUARE IS TAKEN; ¬
       ¬PICK ANOTHER.   ";
3510 GOTO 3100
3800 PRINT "  TO MOVE, TYPE A DIGIT ¬
       ¬FROM 1 TO 9.    ";
3850 GOTO 3100
4000 REM *** UPDATE C(), CHECK FOR WIN
4010 B(M)=F
4050 PRINT "ẖ";
4060 R=INT(L(M)/100): C=L(M)-100*R
4070 FOR J=1 TO R: IF R<>0 THEN PRINT ¬
       ¬"↓";
4075 NEXT J
4080 FOR J=1 TO C: PRINT "→";: NEXT J
4090 PRINT C$((B(M)+3)/2)
4095 GOSUB 8800
4110 FOR J=1 TO 4
4120 : P=U(M,J): IF P=0 THEN 4200
4130 : C(P)=C(P)+F
4140 : IF C(P)=-3 THEN 5600
4150 : IF C(P)=3 THEN 5500
```

```
42ØØ NEXT J
43ØØ N=N+1
431Ø IF N=9 THEN 57ØØ
44ØØ IF F=1 THEN 3ØØØ
5ØØØ REM *** COMPUTER'S MOVE
51ØØ GOSUB 6ØØØ
52ØØ F=1: GOTO 4ØØØ
53ØØ REM  GAME IS OVER
55ØØ A$="***  I WIN  ***": GOTO 9ØØØ
56ØØ A$="*** CONGRATULATIONS, YOU'VE ¬
      ¬WON ***": GOTO 9ØØØ
57ØØ A$="THIS GAME IS A DRAW...":
      ¬ GOTO 92ØØ
6ØØØ REM *** SELECT A MOVE
61ØØ FOR P=1 TO 8
611Ø : IF C(P)=2 THEN 62ØØ
612Ø NEXT P
613Ø FOR P=1 TO 8
614Ø : IF C(P)=-2 THEN 62ØØ
615Ø NEXT P
616Ø GOTO 63ØØ
62ØØ FOR I=1 TO 3
621Ø : M=T(P,I)
622Ø : IF B(M)=Ø THEN 66ØØ
623Ø NEXT I
63ØØ FOR S=1 TO 9: V(S)=Ø: IF B(S)<>Ø ¬
      ¬THEN 64ØØ
631Ø : FOR J=1 TO 4: P=U(S,J)
632Ø : : IF P<>Ø THEN V(S)=V(S)+1+ABS(C(
      ¬P))
635Ø : NEXT J
64ØØ NEXT S
65ØØ V=Ø
651Ø FOR S=1 TO 9
652Ø : IF V(S)<=V THEN 656Ø
653Ø : V=V(S)
654Ø : M=S
656Ø NEXT S
66ØØ RETURN
7ØØØ REM *** GET INPUT
71ØØ GET A$: IF A$<>"" THEN 71ØØ
72ØØ GET A$: IF A$="" THEN 72ØØ
```

```
7300 RETURN
8000 REM *** PRINT THE BOARD
8010 PRINT "ĥ";
8100 FOR J=1 TO 6: PRINT B1$: NEXT J
8110 PRINT B2$
8120 FOR J=1 TO 7: PRINT B1$: NEXT J
8130 PRINT B2$
8140 FOR J=1 TO 6: PRINT B1$: NEXT J
8200 FOR I=1 TO 9: PRINT "h";
8210 R=INT(L(I)/100): C=L(I)-100*R
8220 FOR J=1 TO R: IF R>0 THEN PRINT ¬
      ¬"↓";
8225 NEXT J
8230 FOR K=1 TO C: PRINT "→";: NEXT K
8240 IF B(I)<>0 THEN PRINT C$((B(I)+3)/2
      ¬)
8250 NEXT I
8600 PRINT "h";
8610 FOR J=1 TO 35: PRINT "→";: NEXT J
8620 PRINT "7⌋8⌋9↓←←←←←@[@[@↓←←←←←4⌋5⌋6↓
      ¬←←←←←@[@[@↓←←←←←1⌋2⌋3"
8630 PRINT "h";D$;
8640 RETURN
8800 REM *** CLEAR SCREEN BOTTOM
8830 FOR J=1 TO 80: POKE 33647+J,32:
      ¬ NEXT J
8850 PRINT "h";D$;
8900 RETURN
9000 REM *** FINALE
9100 FOR J=1 TO 4
9110 : POKE 59409,52: REM BLINK SCREEN
9120 : FOR K=1 TO 200:NEXT K
9130 : POKE 59409,60
9140 : FOR K=1 TO 200:NEXT K
9150 NEXT J
9200 FOR J=1 TO 5
9210 : IF INT(J/2)=J/2 THEN 9250
9220 :   PRINT "r";A$
9230 :   FOR K=1 TO 200:NEXT K
9250 : PRINT "h";D$;A$
9260 : FOR K=1 TO 200:NEXT K
9270 : PRINT "h";D$;
```

```
 9280 NEXT J
 9290 F1$="r̲      "
 9295 PRINT "h̲";F1$
 9300 PRINT "↑r̲PRESS ": PRINT F1$:
       ¬ PRINT "↑r̲RETURN": PRINT F1$
 9310 PRINT "↑r̲TO    ": PRINT F1$:
       ¬ PRINT "r̲PLAY  ": PRINT F1$
 9320 PRINT "r̲AGAIN;": PRINT F1$:
       ¬ PRINT "r̲ANY   ": PRINT F1$
 9330 PRINT "r̲OTHER ": PRINT F1$:
       ¬ PRINT "r̲KEY   ": PRINT F1$
 9340 PRINT "r̲TO    ": PRINT F1$:
       ¬ PRINT "r̲STOP  ": PRINT F1$
 9400 GOSUB 7000
 9410 IF ASC(A$)=13 THEN 2000
 9420 PRINT "ĥ↓↓THANKS FOR PLAYING ¬
       ¬TIC-TAC-TOE WITH ME.↓↓"
READY.
```

Reverse

by Mac Oglesby

A row of numbers (or letters) dance onto your screen in this game of skill. The numbers are out of order; in fact, they're thoroughly scrambled. Your challenge is to restore them to their proper consecutive order by reversing their positions. For example, let's use the first five digits. You can win if you can convert them into their proper order, which is 12345. Now let's say they are mixed around and you start with 51432.

The tool at your command is reversal. Press the numeral 2 on your keyboard. The position of the *first two numbers* will be reversed:

15432 (from *51*432 to *15*432)

Press the numeral 3—the position of the *first three numbers* will be reversed:

45132 (from *154*32 to *451*32)

And so on. If you press 5, the position of all five numbers will be reversed.

This is a game of strategy. You can turn these numbers around all day and all night and never get them into the right order until you slow down and plan your attack. There are several surefire methods of always getting your unruly flock of numerals back into line—and we're not telling you what they are!

Once you've invented your strategy, there's still the challenge of getting them right with the least possible moves. (For five numbers, you can always do it in seven or fewer moves.)

You can control the difficulty of this game by taking advantage of the choices Mac gives you. You can choose numbers or letters (depending on how well you know the alphabet), and you can choose from three to nine items (numbers or letters) in a scrambled list.

Unscrambling 312 is an A/B-level challenge. By the time you've worked out your optimum strategy for putting BCAFGEDIH back into order, you've reached C-level gameplaying. No matter how frustrated you get, *don't give up*! Once you've cracked one of the winning strategies, you'll see how obvious it was all the time.

For a mathematical discussion of winning *Reverse* by algorithmic and heuristic constructs, you may order *What To Do After You Hit Return* from People's Computer Company, P.O. Box E, Menlo Park, CA 94025.

```
100 REM *** REVERSE ***
110 REM
120 REM THIS VERSION OF REVERSE IS(C)
130 REM MAC OGLESBY  MAY 1980.
140 REM
150 REM BASED ON THE PROGRAM REVERSE
160 REM BY PETE SESSIONS PUBLISHED IN
170 REM "PEOPLE'S COMPUTER COMPANY"
180 REM
190 REM LAST REVISION 5/11/80 10:30
200 REM
1010 POKE 59468,12:REM GRAPHIC MODE
1020 X=RND(-TI)
1100 DEF FNL(Z)=400+Z*4+32768
1110 SP=32
1130 M=9:WC=1
1200 DN$="h̲↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
1500 PRINT "ĥWELCOME TO r̲REVERSEr̂."
1510 GOSUB 6000
1550 XX$="PRESS r̲RETURNr̂ TO START..."
1560 GOSUB 10000
1580 GET XA$:IF XA$<>"" THEN 1600
1590 N=3+INT(RND(1)*7):GOSUB 5000:
      ¬FOR J=1 TO 500:NEXT
1595 IF FLAG=0 THEN 1580
1600 FLAG=1:PRINT "ĥ";
1610 XX$="WANT INSTRUCTIONS FOR ¬
      ¬r̲REVERSEr̂ (Y OR N)?"
1620 GOSUB 10000
1630 IF XA$="Y" THEN GOSUB 9000
1700 XX$="WANT TO REVERSE r̲Nr̂UMBERS OR ¬
      ¬r̲Lr̂ETTERS?"
1710 GOSUB 10000
1720 IF XA$="N" THEN WC=49:WC$="NUMBERS"
      ¬:GOTO 1800
```

```
1730 IF XA$="L" THEN WC=1:WC$="LETTERS":
      ¬GOTO 18ØØ
174Ø XX$="PLEASE TYPE  N  OR  L":
      ¬GOTO 171Ø
18ØØ XX$="HOW MANY "+WC$+"?  (3 TO 9)"
181Ø GOSUB 1ØØØØ
182Ø M=VAL(XA$):IF (9-M)*(M-3)<Ø THEN ¬
      ¬18ØØ
2ØØØ GOSUB 6ØØØ:REM GET A LIST
21ØØ GOSUB 4ØØØ
211Ø IF WIN=1 THEN 3ØØØ
212Ø PRINT "ĥ":GOTO 2ØØØ
3ØØØ T=T+1
31ØØ IF T=1 THEN PRINT "h̲HERE'S THE ¬
      ¬LIST TO START WITH..."
312Ø XX$="REVERSE HOW MANY?"
315Ø GOSUB 1ØØØØ
316Ø N=VAL(XA$)
317Ø IF XA$="Ø" THEN PRINT "ĥBYE FOR ¬
      ¬NOW...↓↓↓":END
318Ø IF N>1 AND N<=M AND N=INT(N) THEN ¬
      ¬32ØØ
319Ø M$=STR$(M):XX$="TYPE A WHOLE ¬
      ¬NUMBER FROM 2 TO"+M$:GOTO 315Ø
32ØØ IF T=1 THEN PRINT "h̲                ¬
      ¬                   "
321Ø GOSUB 5ØØØ
33ØØ GOSUB 4ØØØ
331Ø IF WIN=1 THEN 3ØØØ
332Ø GOTO 42ØØ
4ØØØ REM TEST FOR WIN
41ØØ WIN=Ø
411Ø FOR J=Ø TO M-2
412Ø :C1=PEEK(FNL(J)):C2=PEEK(FNL(J+1))
413Ø :IF C2-C1<>1 THEN WIN=1
414Ø NEXT
415Ø RETURN
42ØØ REM CELEBRATE!
421Ø FOR J=1 TO 6
422Ø :PRINT "h̲↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓";
423Ø :PRINT "  C O N G R A T U L A T I ¬
      ¬O N S  "
```

```
4240 :FOR K=1 TO 300:NEXT
4250 :IF J/2<>INT(J/2) THEN PRINT "r̲";:
      ¬GOTO 4270
4260 :PRINT "r̂";
4270 NEXT
4300 FOR J=1 TO 500:NEXT
4310 PRINT "↓THE LIST IS NOW IN PROPER ¬
      ¬ORDER."
4320 PRINT "↓IT TOOK YOU";T;"TR";
4330 IF T=1 THEN PRINT "Y.":GOTO 4400
4340 PRINT "IES."
4400 XX$="WANT TO PLAY AGAIN?  (Y OR N)"
4410 GOSUB 10000
4420 IF XA$="Y" THEN T=0:PRINT "ĥ":
      ¬GOTO 1700
4450 PRINT "ĥ↓↓THANKS FOR PLAYING ¬
      ¬r̲REVERSEr̂."
4460 PRINT "↓BYE FOR NOW...":END
5000 REM ROUTINE MOVES LETTERS
5100 FOR J=0 TO N/2-1
5102 :IF FLAG=1 THEN 5108
5104 ::GET XA$:IF XA$<>"" THEN FLAG=1:
      ¬PRINT DN$;"PLEASE STANDBY FOR A ¬
      ¬MOMENT..."
5108 :GOSUB 7100
5110 :LL=FNL(J):LS=PEEK(LL)
5120 :RL=FNL(N-J-1):RS=PEEK(RL)
5130 :FZ=LL+80
5200 :FOR K=1 TO 2
5205 ::GOSUB 7025
5210 ::POKE LL,SP:POKE RL,SP
5220 ::LL=LL-40:RL=RL+40
5230 ::POKE LL,LS:POKE RL,RS
5240 :NEXT K
5250 :GOSUB 7100
5300 :POKE LL,SP:POKE RL,SP
5310 :LL=LL-39:RL=RL+39:POKE LL,LS:
      ¬POKE RL,RS
5312 :FOR K=1 TO 2
5315 ::GOSUB 7025
5320 ::POKE LL,SP:POKE RL,SP:LL=LL+1:
      ¬RL=RL-1
```

```
5330 ::POKE LL,LS:POKE RL,RS
5332 :NEXT K
5335 :GOSUB 7Ø25
534Ø :POKE LL,SP:POKE RL,SP:LL=LL+41:
      ¬RL=RL-41
535Ø :POKE LL,LS:POKE RL,RS
536Ø :IF RL<>FZ THEN 525Ø
537Ø :GOSUB 71ØØ
54ØØ :FOR K=1 TO 2
541Ø ::POKE LL,SP:POKE RL,SP
542Ø ::LL=LL+4Ø:RL=RL-4Ø
543Ø ::POKE LL,LS:POKE RL,RS
544Ø :NEXT K
55ØØ NEXT J
56ØØ RETURN
6ØØØ REM MAKE A LIST
61ØØ FOR J=1 TO M
611Ø :X=INT(M*RND(1))
612Ø :IF PEEK(FNL(X))<>32 THEN 611Ø
613Ø :POKE FNL(X),J+WC-1
614Ø NEXT
62ØØ RETURN
7ØØØ REM VARIOUS DELAYS
7ØØ5 FOR Z1=1 TO 5:NEXT:RETURN
7Ø1Ø FOR Z1=1 TO 1Ø:NEXT:RETURN
7Ø25 FOR Z1=1 TO 25:NEXT:RETURN
7Ø5Ø FOR Z1=1 TO 5Ø:NEXT:RETURN
71ØØ FOR Z1=1 TO 1ØØ:NEXT:RETURN
9ØØØ REM INSTRUCTIONS
91ØØ PRINT "ĥTHIS IS THE GAME OF ¬
      ¬r̲REVERSEr̂."
911Ø PRINT "⤈TO WIN, ALL YOU HAVE TO DO ¬
      ¬IS ARRANGE"
912Ø PRINT "⤈A LIST OF NUMBERS OR ¬
      ¬LETTERS IN ORDER"
913Ø PRINT "⤈FROM LEFT TO RIGHT.  HERE ¬
      ¬ARE TWO"
914Ø PRINT "⤈WINNING ARRANGEMENTS:"
915Ø PRINT "⤈⤈⤈1   2   3   4   5   6   ¬
      ¬7   8   9"
916Ø PRINT "⤈⤈⤈A   B   C   D   E   F   ¬
      ¬G   H   I"
```

```
 9170 XX$="PRESS r̲RETURNr̂ TO CONTINUE"
 9180 GOSUB 10000
 9200 PRINT "ĥTO MOVE, TELL ME HOW MANY ¬
        ¬(COUNTING"
 9210 PRINT "↓FROM THE LEFT) TO REVERSE. ¬
        ¬ FOR EXAMPLE,"
 9220 PRINT "IF THE CURRENT LIST IS:"
 9230 PRINT "↓↓D   C   B   A   E   F   G"
 9240 PRINT "↓AND YOU REVERSE 4, THE ¬
        ¬RESULT WILL BE:"
 9250 PRINT "↓↓A   B   C   D   E   F   G"
 9260 PRINT "↓AND YOU WIN!"
 9270 PRINT "↓↓↓TO QUIT, REVERSE 0 ¬
        ¬(ZERO)."
 9300 XX$="PRESS r̲RETURNr̂ TO BEGIN..."
 9310 GOSUB 10000
 9320 PRINT "ĥ":RETURN
 10000 REM GET A CHARACTER
 10010 IF XX$="" THEN 10200
 10100 PRINT DN$;XX$;
 10200 GET XA$:IF XA$<>"" THEN 10200
 10205 IF FLAG=0 THEN RETURN
 10210 GET XA$:IF XA$="" THEN 10210
 10220 REM
 10300 PRINT "
        ¬":REM LINE 10300 ¬
        ¬PRINT 40 DEL
 10310 RETURN
READY.
```

Watchperson

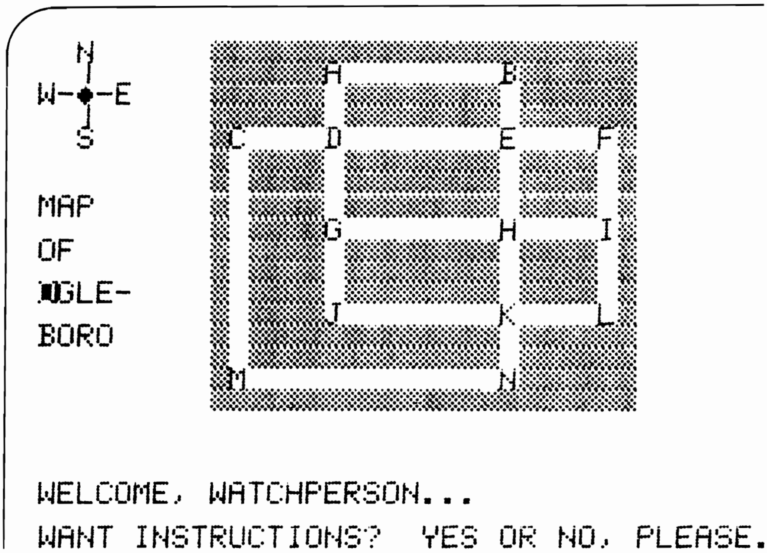
by Mac Oglesby

"I must go in and out."—George Bernard Shaw, *Heartbreak House*

You've been appointed Watchperson for the Village of Ogleboro. Your appointed duty is to patrol the streets without retracing any of your steps. The Village Elders have instructed you in no uncertain terms to cover *all* the streets, but not to turn around. You can revisit corners during your vigil but you can't repeat any part of your route.

If you can accomplish this task successfully, you're in line for promotion to Senior Watchperson of the growing community of Kunktown. If you've patrolled the streets of Kunktown according to City regulations, you may be honored with the title of Master Watchperson. You are then qualified to patrol that thriving metropolis, Lindburg.

To start, here's a map of Ogleboro:



```
WELCOME, WATCHPERSON...
WANT INSTRUCTIONS?  YES OR NO, PLEASE.
```

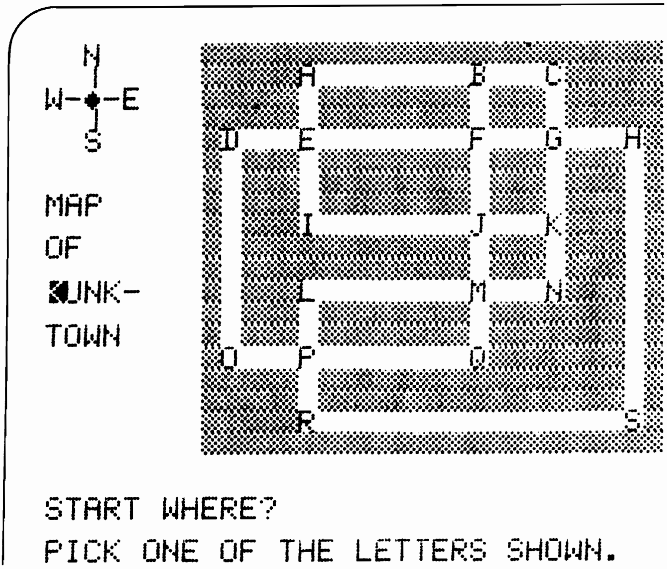
You may choose where to start. Your computer traces the path your footsteps take as you carry out your appointed rounds. Plan your route carefully, or you might be demoted to Crocodile-Catcher or the Dragon Patrol!

While you're studying the city map, here's a story. Once upon a time there was a town in Prussia named Königsberg. The good burghers whiled away their afternoons watching people go back and forth across the seven bridges that connected the island of Kneiphof with the mainland by spanning two branches of the River Pregel. As they drank their beer they wondered if anyone could cross all seven bridges without retracing their steps.

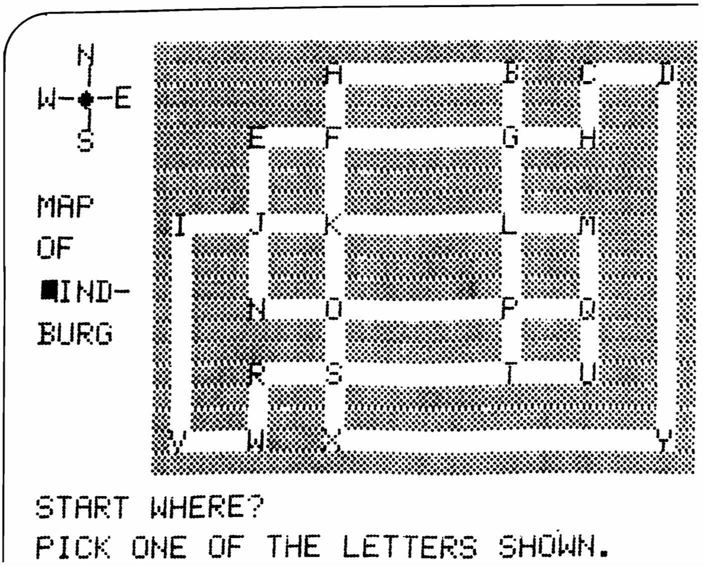
None of the inhabitants of Königsberg ever figured it out. A Swiss mathematician named Leonhard Euler (1707-1783) solved the problem by drawing the world's first graph, thereby discovering scientific principles that led to the foundation of topology—the geometry of distortion. What's more, he solved this problem even though he was almost blind and had his thirteen children playing around the house. Here's to Leonhard Euler—the inspiration for our puzzle, and an inspiration to us all!

If you'd like to find out how Leonhard Euler crossed the Seven Bridges of Königsberg, read his solution in "The Seven Bridges of Königsberg," James Newman, *The World of Mathematics,* Vol. 1, New York, 1956. For more on topology, see the article by Richard Courant and Herbert Robbins in the same book. They also prove Euler's theorem for us.

Oh, just in case you were wondering, here are bird's eye views of Kunktown and Lindburg:



```
START WHERE?
PICK ONE OF THE LETTERS SHOWN.
```



```
MAP
OF
■IND-
BURG

START WHERE?
PICK ONE OF THE LETTERS SHOWN.
```

```
100 REM  ***WATCHPERSON***
110 REM
120 REM (C) MAC OGLESBY   MARCH 198Ø
130 REM
140 REM   LAST REVISED: 3/22/8Ø 22:3Ø
150 REM
160 REM COPYRIGHT 198Ø BY MAC OGLESBY
170 REM
180 REM
1ØØØ REM INITIALIZATION
1Ø1Ø POKE 59468,12 : REM GRAPHICS MODE
1Ø2Ø DIM LC(25),DS(25),LS(25)
1Ø3Ø V$(1)="r̲Or̂GLE-↓↓←←←←←BORO"
1Ø4Ø V$(2)="r̲Kr̂UNK-↓↓←←←←←TOWN"
1Ø5Ø V$(3)="r̲Lr̂IND-↓↓←←←←←BURG"
1Ø6Ø FOR J=1 TO 4:READ DA(J),DA$(J):
      ¬NEXT:REM DIRECTION ALLOWED
1Ø7Ø DATA-4Ø," N ",1," E ",4Ø," S ",-1,
      ¬" W "
112Ø SP$="         "
113Ø DN$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
114Ø SQ$="&&&&&&&&&&&&&&&&&&&&&&&&&&&&"
1145 REM
115Ø ZZ$="
      ¬":REM LINE 115Ø ZZ$=4Ø ¬
      ¬DEL
116Ø VN=1:GOSUB 8ØØØ
117Ø PRINT "h̲";DN$;"WELCOME, WATCHPERSON
      ¬..."
118Ø XX$="WANT INSTRUCTIONS?  YES OR NO,
      ¬ PLEASE."
119Ø GOSUB 1ØØØØ:NØ$=XA$
12ØØ PRINT "ĥ";
121Ø PRINT "AS WATCHPERSON, YOU'VE BEEN ¬
      ¬HIRED TO"
122Ø PRINT "↓WALK ALL OF THE STREETS OF ¬
      ¬A VILLAGE"
123Ø PRINT "↓WITHOUT RETRACING ANY OF ¬
      ¬YOUR STEPS."
124Ø PRINT "↓↓CHOOSE A VILLAGE:  ¬
      ¬r̲Or̂GLEBORO, r̲Kr̂UNKTOWN,"
125Ø PRINT "↓OR r̲Lr̂INDBURG.  LINDBURG ¬
      ¬IS THE HARDEST."
```

```
1260 XX$="PLEASE TYPE  O, K, OR L"
1270 GOSUB 10000
1280 IF XA$="O" THEN VN=1:GOTO 1300
1285 IF XA$="K" THEN VN=2:GOTO 1300
1290 IF XA$="L" THEN VN=3:GOTO 1300
1295 XX$="r̲"+XX$:GOTO 1270
1300 IF N0$="N" THEN 1470
1305 A$="FOOTPRINTS"
1310 PRINT "ĥ↓↓→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬";
1315 FOR J=1 TO LEN(A$):PRINT MID$(A$,J,
      ¬1);:GOSUB 7025:NEXT
1320 A0=32951: POKE A0,87
1340 FOR J=1 TO 12:GOSUB 7025:A0=A0-1:
      ¬POKE A0,87:NEXT
1350 FOR J=1 TO 4:GOSUB 7025:A0=A0-40:
      ¬POKE A0,87:NEXT
1360 FOR J=1 TO 9:GOSUB 7025:A0=A0+1:
      ¬POKE A0,87:NEXT
1370 FOR J=1 TO 6:GOSUB 7025:A0=A0+40:
      ¬POKE A0,87:NEXT
1380 FOR J=1 TO 15:GOSUB 7025:POKE A0-J,
      ¬87:NEXT
1390 FOR J=16 TO 18:GOSUB 7025:POKE ¬
      ¬A0-J,46:NEXT
1400 GOSUB 7200
1405 PRINT "h̲↓↓↓↓↓↓↓↓↓↓";
1410 PRINT "ALTHOUGH YOU MAY r̲NOTr̂ WALK ¬
      ¬TWICE ON"
1420 PRINT "↓ANY STREET, YOU r̲MAYr̂ ¬
      ¬REVISIT CORNERS."
1430 PRINT "↓↓REMEMBER, YOUR TASK IS TO ¬
      ¬WALK ALONG"
1440 PRINT "↓r̲ALLr̂ OF THE STREETS.  ¬
      ¬GOOD LUCK!"
1450 XX$="PRESS r̲RETURNr̂ TO START..."
1460 GOSUB 10000
1470 GOSUB 8000
1480 Z0=0
1490 FOR J=1 TO NC:POKE 32767+LC(J),J:
      ¬NEXT
1500 PRINT "h̲";DN$;"START WHERE?"
```

```
1510 XX$="PICK ONE OF THE LETTERS ¬
      ¬SHOWN."
1520 GOSUB 10000
1530 IF ASC(XA$)>64 AND ASC(XA$)<65+NC ¬
      ¬THEN 1550
1540 XX$="r"+XX$:GOTO 1520
1550 ZØ=32767+LC(ASC(XA$)-64)
1560 XX$="TYPE  X  TO CANCEL STARTING ¬
      ¬POINT."
1600 A$=""
1610 FOR J=1 TO 4
1620 :IF PEEK(ZØ+DA(J))=32 THEN ¬
      ¬A$=A$+DA$(J)
1630 NEXT
1700 PRINT "h";DN$;"WALK WHICH WAY?  ¬
      ¬CHOICES: ";A$
1710 GOSUB 10000
1720 IF S>Ø THEN 1740
1730 IF XA$="X" THEN PRINT ZZ$;ZZ$;ZZ$:
      ¬GOTO 1480
1740 IF XA$="N" THEN D=-40
1750 IF XA$="E" THEN D=1
1760 IF XA$="S" THEN D=40
1770 IF XA$="W" THEN D=-1
1780 IF PEEK(ZØ+D)<>32 THEN A$="r"+A$:
      ¬GOTO 1700
1790 IF S>Ø THEN 1825
1800 FOR J=1 TO NC:POKE LC(J)+32767,32:
      ¬NEXT
1810 XX$=""
1820 PRINT ZZ$;ZZ$;
1825 PRINT ZZ$;ZZ$
1830 S=S+1:POKE ZØ,87
1840 CR=Ø
1850 ZØ=ZØ+D:POKE ZØ,87
1855 S=S+1
1860 FOR J=1 TO 4
1870 :IF PEEK(ZØ+DA(J))=32 THEN CR=CR+1:
      ¬D1=DA(J)
1880 NEXT
1890 IF CR=Ø THEN 1960
1900 IF CR=1 OR CR=11 THEN D=D1:
      ¬GOTO 1840
```

```
1910 IF CR=10 THEN 2000
1920 IF CR<5 OR CR=12 THEN D=0:GOTO 1600
1960 IF PEEK(Z0+D)=87 THEN CR=10:
      ¬GOTO 1850
2000 REM END OF GAME CELEBRATION
2050 A$="YOU WERE SUPPOSED TO WALK ¬
      ¬EVERY STREET!"
2100 IF S=TS THEN A$="EXCELLENT!!  YOU ¬
      ¬WALKED EVERY STREET!!!"
2110 FOR J=1 TO 3
2120 :POKE 59409,52:REM SCREEN OFF
2130 :FOR K=1 TO 300:NEXT
2140 :POKE 59409,60:REM SCREEN ON
2150 :FOR K=1 TO 300:NEXT
2160 NEXT
2200 FOR J=1 TO 5
2210 :PRINT "h̲";DN$;A$
2220 :FOR K=1 TO 300:NEXT
2230 :IF J/2=INT(J/2) THEN PRINT "r̂";:
      ¬GOTO 2250
2240 :PRINT "r̲";
2250 NEXT
2300 XX$="r̂PRESS r̲Yr̂ TO PLAY AGAIN; r̲Nr̂ ¬
      ¬TO STOP."
2310 GOSUB 10000
2320 IF XA$="Y" THEN PRINT "ĥRUN":RUN
2330 PRINT "ĥTHANKS FOR WALKING MY ¬
      ¬STREETS."
2340 PRINT "↓   BYE FOR NOW, WATCHPERSON
      ¬..."
2350 END
7000 REM VARIOUS DELAYS
7025 FOR X9=1 TO 25:NEXT:RETURN
7200 FOR X9=1 TO 200:NEXT:RETURN
8000 REM READ VILLAGE DATA AND DRAW IT
8010 IF VC=VN THEN 8200
8100 READ LH,WH:REM LENGTH, WIDTH OF ¬
      ¬REVERSE FIELD
8110 READ NC,TS:REM NUMBER OF CORNERS,
      ¬ TOTAL STEPS
8120 FOR J=1 TO NC:READ LC(J):NEXT:
      ¬REM LOCATION OF CORNERS (HOME=1)
```

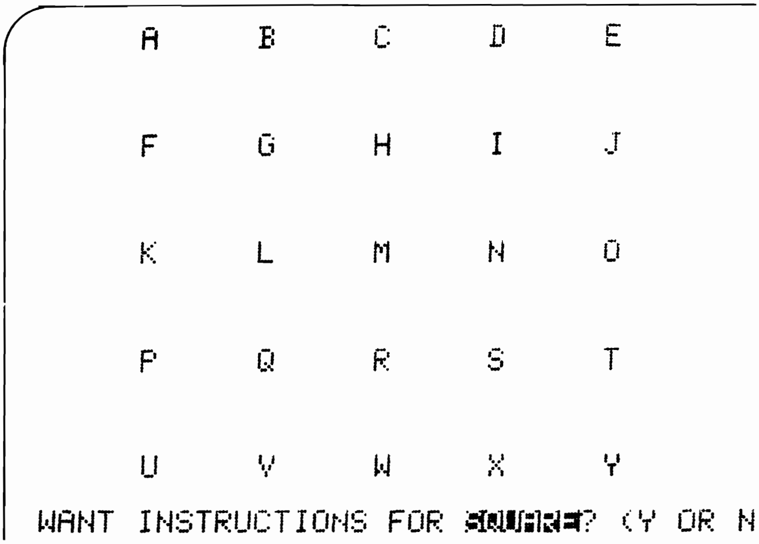
```
8130 READ NS:REM NUMBER OF STREETS TO ¬
      ¬DRAW
8140 FOR J=1 TO NS:READ DS(J),LS(J):
      ¬NEXT:REM DIRECTION,LENGTH OF ¬
      ¬STREETS TO DRA
8150 READ SD:REM START DRAWING WHERE?
8160 VC=VC+1:GOTO 8010
8200 PRINT "ĥ";
8210 A$=LEFT$(SP$,(40-LH)/2)+"r̲"+LEFT$(S
      ¬Q$,LH)
8220 FOR J=1 TO WH:PRINT A$:NEXT
8230 PX=32767+SD
8240 POKE PX,32
8250 FOR I=1 TO NS
8260 :FOR J=1 TO LS(I)
8270 : PX=PX+DS(I):POKE PX,32
8280 :NEXT J
8290 NEXT I
8300 FOR J=1 TO NC:POKE 32767+LC(J),J:
      ¬NEXT
8310 PRINT "h̲→→N↓←l̲↓←←←W-Z̲-E↓←←←l̲↓←S"
8320 PRINT "↓↓MAP↓↓←←←OF↓↓←←";V$(VN)
8400 RETURN
9000 REM DATA FOR VILLAGES
9100 REM OGLEBORO
9110 DATA 22,17:REM LH,WH
9120 DATA 14,120:REM NC,TS
9130 DATA 56,65,171,176,185,190,336,345,
      ¬350,496,505,510,611,625:REM LC()
9140 DATA 14:REM NS
9150 DATA 1,19,40,8,-1,5,40,3,-1,14,-40,
      ¬11,1,5,40,8,1,14,-40,4
9160 DATA -1,14,-40,7,1,9,40,10:
      ¬REM DS(),LS()
9170 DATA 171:REM SD
9200 REM KUNKTOWN
9210 DATA 24,19:REM LH,WH
9220 DATA 19,157:REM NC,TS
9230 DATA 54,63,67,170,174,183,187,191,
      ¬334,343,347
9235 DATA 454,463,467,570,574,583,694,
      ¬711:REM LC()
```

```
 9240 DATA 14:REM NS
 9250 DATA 1,21,40,13,-1,17,-40,6,1,13,
       ¬-40,10,-1,13,40,7,1,13
 9260 DATA -40,7,-1,4,40,13,-1,13,-40,10:
       ¬REM DS(),LS()
 9270 DATA 170:REM SD
 9300 REM LINDBURG
 9310 DATA 28,20:REM LH,WH
 9320 DATA 25,195:REM NC,TS
 9330 DATA 56,65,69,73,172,176,185,189,
       ¬328,332,336,345,349
 9335 DATA 492,496,505,509,612,616,625,
       ¬629,728,732,736,753:REM LC()
 9340 DATA 20:REM NS
 9350 DATA 1,21,40,7,-1,17,40,3,-1,4,-40,
       ¬10,1,4,40,4,1,17,40,3,-1,4
 9360 DATA -40,14,-1,9,40,17,1,17,-40,17,
       ¬-1,4,40,3,-1,17,40,4:REM DS(),LS()
 9370 DATA 328:REM SD
 10000 REM GET A CHARACTER
 10050 PRINT "h";DN$;"↓↓";
 10100 IF XX$<>"" THEN PRINT XX$
 10200 GET XA$:IF XA$<>"" THEN 10200
 10300 GET XA$:GOSUB 10500:IF XA$="" ¬
       ¬THEN 10300
 10350 RETURN
 10500 REM BLINK
 10600 IF Z0=0 THEN 10700
 10610 IF TI-TT<20 THEN 10700
 10620 IF PEEK(Z0)+128<256 THEN POKE Z0,
       ¬PEEK(Z0)+128:GOTO 10690
 10630 POKE Z0,PEEK(Z0)-128
 10690 TT=TI
 10700 RETURN
READY.
```

Square

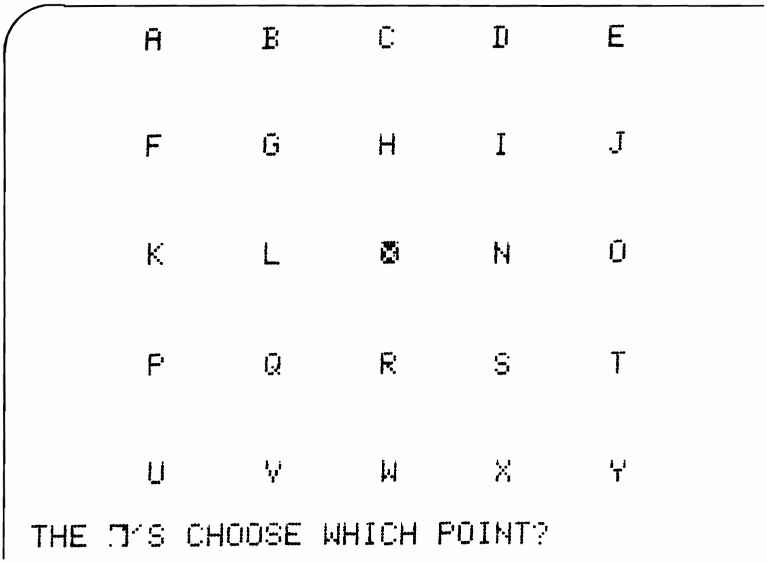
by Mac Oglesby

How well do you relate to squares? (No, we're not talking about the older generation!) In this game for one or two players, you must choose the four corners of a square. You're given a playing field sprinkled with letters:



```
        A       B       C       D       E

        F       G       H       I       J

        K       L       M       N       O

        P       Q       R       S       T

        U       V       W       X       Y
 WANT INSTRUCTIONS FOR SQUARE? (Y OR N
```

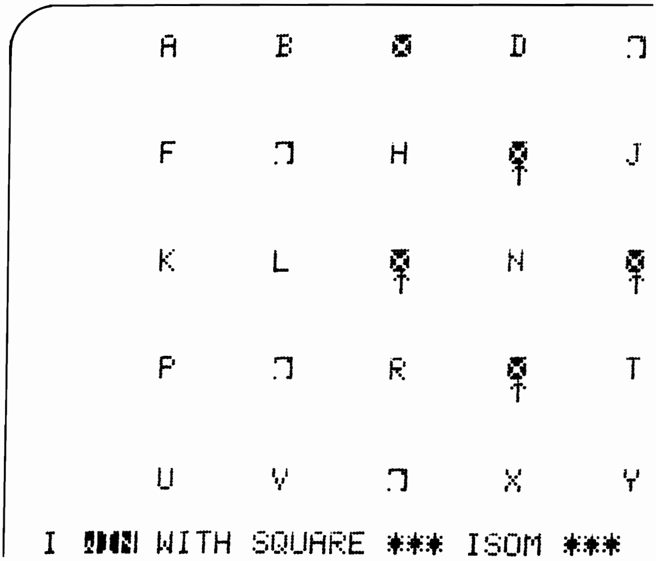
You choose a letter and the computer marks it with your symbol. For instance, if you choose M and your symbol is X, the screen will look like:



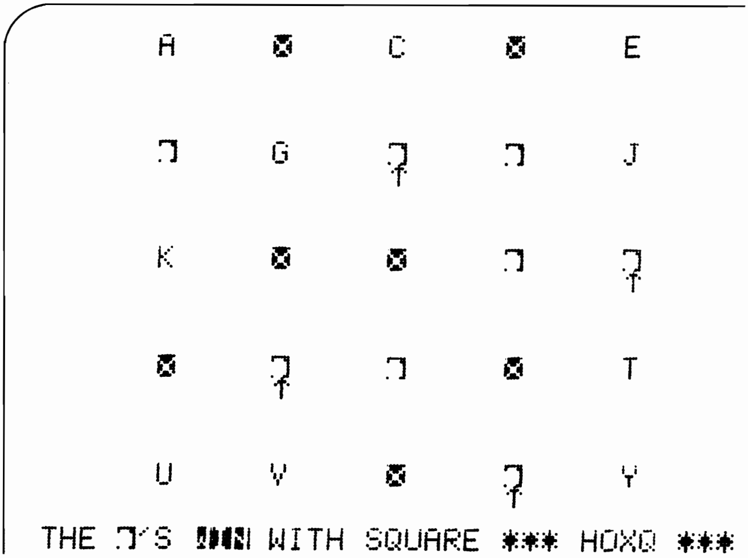
```
        A       B       C       D       E

        F       G       H       I       J

        K       L       X       N       O

        P       Q       R       S       T

        U       V       W       X       Y
 THE X'S CHOOSE WHICH POINT?
```

So far, so good. Finding four corners may sound like a relatively simple task, but your computer/opponent will block you every chance it gets, or cut corners to beat you to the finish line. Your computer plays very well indeed, but not perfectly. You can beat it.

Think square to win this game—any size square—even tilted squares. There are more squares on your playing field than you ever

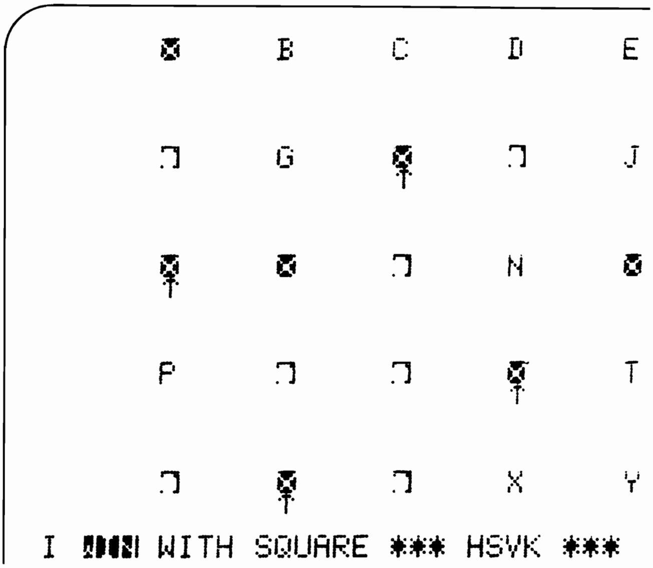


```
          A      B      ▣      D      ⌝

          F      ⌝      H      ▣      J
                               †

          K      L      ▣      N      ▣
                        †             †

          P      ⌝      R      ▣      T
                               †

          U      V      ⌝      X      Y
   I ███ WITH SQUARE *** ISOM ***
```

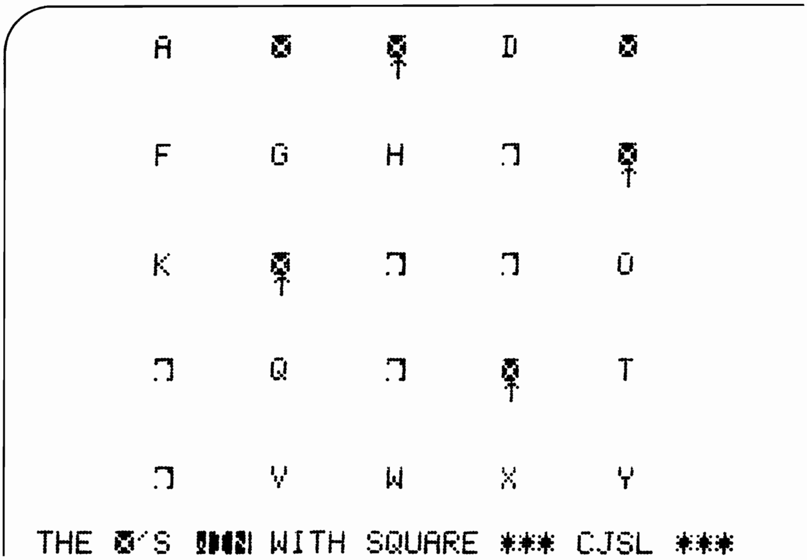


```
          A      ▣      C      ▣      E

          ⌝      G      ⌝      ⌝      J
                        †

          K      ▣      ▣      ⌝      ⌝
                                      †

          ▣      ⌝      ⌝      ▣      T
                 †

          U      V      ▣      ⌝      Y
                               †
   THE ⌝'S ███ WITH SQUARE *** HOXQ ***
```

thought possible! You may choose whether you or the computer go first in this Level B-C game. When you or the computer win (and we're sure you'll plunge into this game with determination and win), the computer will flash arrows under the winning corners to show you a successful square.



```
     ☒    B    C    D    E

     ⌝    G    ☒    ⌝    J
               ↑

     ☒    ☒    ⌝    N    ☒
     ↑

     P    ⌝    ⌝    ☒    T
                    ↑

     ⌝    ☒    ⌝    X    Y
          ↑
I [illegible] WITH SQUARE *** HSVK ***
```



```
     A    ☒    ☒    D    ☒
               ↑

     F    G    H    ⌝    ☒
                         ↑

     K    ☒    ⌝    ⌝    O
          ↑

     ⌝    Q    ⌝    ☒    T
                    ↑

     ⌝    V    W    X    Y
THE ☒'S [illegible] WITH SQUARE *** CJSL ***
```

```
100 REM *** SQUARE ***
110 REM
120 REM (C) 198Ø MAC OGLESBY
13Ø REM  LAST REVISION 2/1Ø/8Ø  12:15
14Ø REM
15Ø REM  CHANGED 3/2/8Ø: REMOVED
16Ø REM     SCREEN PRINT OPTION
2ØØ REM
21Ø REM  CHANGED 3/28/8Ø: FIXED BUG IN
22Ø REM     LINE 127Ø: (HOXQ WAS HOXG)
23Ø REM
24Ø REM  ALSO REMOVED ALL LOWERCASE
25Ø REM
1ØØØ REM INITIALIZATION
1ØØ5 GOTO 1Ø1Ø
1ØØ6 X=1
1Ø1Ø POKE 59468,12
1Ø2Ø DIM Q%(5Ø),V%(5Ø),SQ$(5Ø),SW$(24),
      ¬D$(4,4),U(12),PL$(2)
1Ø3Ø PL$(1)="rVr̂":PL$(2)="rQr̂"
1Ø4Ø TN=1:F=1
11ØØ ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
112Ø REM
113Ø ZZ$="
      ¬"
114Ø REM LINE 113Ø IS ZZ$="4Ø DELETES"
12ØØ REM SQ$() SPECIFIES SQUARES' ¬
      ¬CORNERS
121Ø FOR J=1 TO 5Ø:READ SQ$(J):NEXT
122Ø DATA ABGF,ACMK,ADSP,AEYU,BCHG,BDNL
123Ø DATA BETQ,BHLF,BIRK,BJXP,CDIH,CEOM
124Ø DATA CIMG,COWK,CJSL,CNQF,DEJI,DJNH
125Ø DATA DORG,DTVF,FGLK,FHRP,FIXU,GHML
126Ø DATA GISQ,GJYV,GMQK,GNWP,HINM,HJTR
127Ø DATA HNRL,HOXQ,HSVK,IJON,ISOM,ITWL
128Ø DATA KLQP,KMWU,LMRQ,LNXV,LRVP,MNSR
129Ø DATA MOYW,MSWQ,NOTS,NTXR,PQVU,QRWV
13ØØ DATA RSXW,STYX
131Ø REM SW$() TELLS WHICH SQUARES FROM ¬
      ¬LIST SQ$ HAVE A CORNER AT EACH ¬
      ¬POINT
132Ø FOR J=Ø TO 24:READ SW$(J):NEXT
```

```
1330 DATA "!"#$","!%&'()*",""%+,-./Ø",
      ¬"#&+1234","$',1"
1340 DATA "!(Ø4567","!%-3589:;<",
      ¬"%(+268=>?@A",")+-179=BCD",
      ¬"*/12:>B"
1350 DATA "").5;AEF","&(/58?DEGHI",
      ¬"",-8;=CFGJKL","&Ø2<=?BHJMN",
      ¬",.3@BCKM"
1360 DATA "#*6<EIO","'Ø9;@EGLOP",
      ¬")36>?GIJNPO","#/9ACJLMOR",
      ¬"'4>DMNR"
1370 DATA "$7FO","4:AHIOP",".<DFKLPO",
      ¬"*7@HNOR","$:KR"
1500 FOR J=Ø TO 4: FOR K=Ø TO 4
1510 :D$(J,K)=CHR$(65+K+J*5)
1520 NEXT:NEXT
2ØØØ REM
2Ø5Ø GOSUB 8ØØØ
2Ø6Ø IF X=1 THEN 22ØØ
21ØØ XX$="WANT INSTRUCTIONS FOR ¬
      ¬rSQUAREr̂? (Y OR N)"
211Ø GOSUB 1ØØØØ:IF XA$="Y" THEN GOSUB ¬
      ¬9ØØØ
22ØØ XX$="HOW MANY HUMAN PLAYERS? (1 OR ¬
      ¬2)"
221Ø GOSUB 1ØØØØ:IF XA$="1" THEN PL=1:
      ¬GOTO 23ØØ
222Ø IF XA$="2" THEN PL=2:GOTO 25ØØ
223Ø XX$="r"+XX$:GOTO 221Ø
23ØØ PRINT "h";ZD$;"OK, I'LL PLAY THE ¬
      ¬rVr̂'S":FOR J=1 TO 2ØØØ:NEXT
24ØØ XX$="WHO GOES FIRST, rYr̂OU OR THE ¬
      ¬rCr̂OMPUTER?"
241Ø GOSUB 1ØØØØ:IF XA$="Y" THEN F=2:
      ¬GOTO 25ØØ
242Ø IF XA$="C" THEN TN=2:GOTO 25ØØ
243Ø XX$="PLEASE TYPE  Y  OR  C":
      ¬GOTO 241Ø
25ØØ REM
3ØØØ REM
31ØØ TN=3-TN:N=N+1
311Ø IF TN=2 OR PL=2 THEN 5ØØØ
```

```
3115 IF N<3 THEN 3200
3120 PRINT"h";ZD$;"rI'M FIGURING OUT MY ¬
      ¬MOVE...r̂"
3200 IF N>2 THEN 3300
3210 IF D$(2,2)="M" THEN R1=2:C1=2:
      ¬GOTO 4500
3220 Q0=9:GOTO 3400
3300 IF N>4 THEN 3800
3310 IF F=2 THEN Q0=19
3400 K9=0
3410 FOR J1=1 TO 50
3420 :IF Q%(J1)<>1+Q0 THEN 3440
3430 :K9=K9+1:U(K9)=J1
3440 NEXT J1
3450 IF K9=0 THEN 3720
3500 J2=K9
3510 :T9=1+INT(J2*RND(3)):J1=U(T9)
3520 :K1=1
3530 ::X$=MID$(SQ$(J1),K1,1):X=ASC(X$)-6
      ¬5
3540 ::R1=INT(X/5):C1=X-5*R1
3550 ::IF D$(R1,C1)=PL$(1) OR D$(R1,
      ¬C1)=PL$(2) THEN 3640
3560 ::IF Q0+N>4 THEN 4500
3570 ::M0=0
3580 ::FOR J3=1 TO LEN(SW$(X))
3590 :::Z$=MID$(SW$(X),J3,1):Z=ASC(Z$)-1
      ¬60
3600 :::IF Q%(Z)>1 THEN 3620
3610 :::M0=M0+1
3620 ::NEXT J3
3630 ::IF M0=>7 THEN 4500
3640 :IF K1<4 THEN K1=K1+1:GOTO 3530
3700 :T8=U(J2):U(J2)=U(T9):U(T9)=T8
3710 IF J2>1 THEN J2=J2-1:GOTO 3510
3720 R1=INT(5*RND(1)):C1=INT(5*RND(1))
3730 IF D$(R1,C1)<>PL$(1) AND D$(R1,
      ¬C1)<>PL$(2) THEN 4500
3740 GOTO 3720
3800 J1=1
3810 :IF Q%(J1)=3 THEN 3520
3820 IF J1<50 THEN J1=J1+1:GOTO 3810
3900 J1=1
```

```
3910 :IF Q%(J1)=30 THEN 3520
3920 IF J1<50 THEN J1=J1+1:GOTO 3910
4000 K9=0
4010 FOR J1=1 TO 50
4020 :IF Q%(J1)=2 THEN K9=K9+1:U(K9)=J1
4030 NEXT J1
4040 IF K9=0 THEN 4410
4100 I0=1
4110 :J0=K9
4120 ::M9=1+INT(J0*RND(1)):J1=U(M9):T9=0
4130 ::FOR K1=1 TO 4
4140 :::X$=MID$(SQ$(J1),K1,1):X=ASC(X$)-
      ¬65:R1=INT(X/5):C1=X-5*R1
4150 :::IF D$(R1,C1)=PL$(1) OR D$(R1,
      ¬C1)=PL$(2) THEN 4170
4160 :::T9=T9+1:R(T9)=R1:C(T9)=C1
4170 ::NEXT K1
4180 ::J2=1
4190 :::FOR J3=1 TO 50:V%(J3)=Q%(J3):
      ¬NEXT J3
4200 :::X=5*R(J2)+C(J2)
4210 :::FOR J3=1 TO LEN(SW$(X))
4220 ::::Z$=MID$(SW$(X),J3,1):Z=ASC(Z$)-
      ¬160
4230 ::::V%(Z)=V%(Z)+1
4240 :::NEXT J3
4250 :::X=5*R(3-J2)+C(3-J2)
4260 :::FOR J3=1 TO LEN(SW$(X))
4270 ::::Z$=MID$(SW$(X),J3,1):Z=ASC(Z$)-
      ¬160
4280 ::::V%(Z)=V%(Z)+10
4290 :::NEXT J3
4300 :::J3=1
4310 ::::IF V%(J3)=4-I0 THEN R1=R(J2):
      ¬C1=C(J2):GOTO 4500
4320 :::IF J3<50 THEN J3=J3+1:GOTO 4310
4330 ::IF J2=1 THEN J2=2:GOTO 4190
4340 ::T8=U(J0):U(J0)=U(M9):U(M9)=T8
4350 :IF J0>1 THEN J0=J0-1:GOTO 4120
4360 IF I0=1 THEN I0=2:GOTO 4110
4400 J1=U(1+INT(K9*RND(1))):GOTO 3520
4410 Q0=19:GOTO 3400
```

```
4500 A$=D$(R1,C1)
4505 PRINT "h̲";ZD$;"r̲HERE'S MY MOVE...r̂ ¬
      ¬          ";
4510 FOR J3=1 TO 2
4520 :D$(R1,C1)=PL$(1):PRINT "h̲";:
      ¬GOSUB 8090
4530 :D$(R1,C1)=A$:PRINT "h̲";:GOSUB 8090
4550 NEXT J3
4560 X=5*R1+C1
4600 GOTO 5400
5000 REM GET HUMAN'S MOVE
5100 XX$="THE "+PL$(TN)+"'S CHOOSE ¬
      ¬WHICH POINT?"
5110 GOSUB 10000
5200 X=ASC(XA$)-65:IF X=>0 AND X<25 ¬
      ¬THEN 5300
5210 XX$="ILLEGAL MOVE, "+PL$(TN)+".  ¬
      ¬TRY AGAIN...":GOTO 5110
5300 R1=INT(X/5):C1=X-5*R1:IF D$(R1,
      ¬C1)<>"r̲V̲r̂" AND D$(R1,C1)<>"r̲O̲r̂" ¬
      ¬THEN 5400
5310 XX$="THAT POINT IS TAKEN!  PICK ¬
      ¬ANOTHER...":GOTO 5110
5400 D$(R1,C1)=PL$(TN)
5410 PRINT "h̲";:GOSUB 8090
5500 FOR J=1 TO LEN(SW$(X))
5510 Z$=MID$(SW$(X),J,1):Z=ASC(Z$)-160
5520 :Q%(Z)=Q%(Z)+1+(TN-1)*9
5530 :IF Q%(Z)<>4+(TN-1)*36 THEN 5570
5540 GOTO 7000
5570 NEXT J
5580 IF N=24 THEN PRINT "h̲";ZD$;"THIS ¬
      ¬GAME IS A DRAW...":GOSUB 10300
5600 GOTO 3000
7000 REM WRAP IT UP
7010 A$="THE "+PL$(TN)+"'S "
7020 IF PL=1 AND TN=1 THEN A$="I "
7025 IF PL=1 AND TN=2 THEN A$="YOU ":
      ¬GOSUB 7500:GOSUB 8000
7045 A$=A$+"r̲WINr̂ WITH SQUARE *** ¬
      ¬"+SQ$(Z)+" ***"
7050 FOR J=1 TO 4
```

```
7Ø55 :X$=MID$(SQ$(Z),J,1):X=ASC(X$)-65
7Ø6Ø :PØ=4Ø*(1+5*INT(X/5))+6*(X-5*(INT(X
      ¬/5)))+6
7Ø7Ø :POKE 32768+PØ,3Ø
7Ø8Ø NEXT J
7Ø9Ø FOR J=1 TO 5ØØ:NEXT J
71ØØ PRINT "h̲";ZD$;A$
71Ø5 FOR J=1 TO 5ØØ:NEXT J
711Ø FOR J=1 TO 4
712Ø :POKE 594Ø9,52
713Ø :FOR K=1 TO 4ØØ:NEXT
714Ø :POKE 594Ø9,6Ø
715Ø :FOR K=1 TO 4ØØ:NEXT
716Ø NEXT
717Ø FOR J=1 TO 2ØØØ:NEXT
718Ø XX$="↓→→→→→→→→PRESS  RETURN  TO ¬
      ¬PLAY AGAIN..."
72ØØ GOSUB 1ØØØØ
721Ø IF ASC(XA$)=13 THEN PRINT "ĥRUN":
      ¬RUN 1ØØ6
73ØØ PRINT "ĥ↓↓↓THANKS FOR PLAYING ¬
      ¬r̲SQUAREr̂ WITH ME..."
731Ø PRINT "↓↓↓→→→→TYPE  RUN  TO PLAY ¬
      ¬AGAIN.↓↓↓"
732Ø END
75ØØ PRINT "ĥ";
751Ø F$=". .↓←←+↓←←J̲@̲K̲ ↑↑":D$="↓↓↓↓←←←←"
      ¬:L$="←←←←←←←←":U$="↑↑↑↑←←←←"
752Ø R=9:D=5:L=8:U=4
753Ø FOR J=1 TO 3
754Ø :FOR K=1 TO R:PRINT F$;:NEXT
755Ø :FOR K=1 TO D:PRINT D$;F$;:NEXT
756Ø :FOR K=1 TO L:PRINT L$;F$;:NEXT
757Ø :FOR K=1 TO U:PRINT U$;F$;:NEXT
758Ø :R=R-2:D=D-2:L=L-2:U=U-2
759Ø NEXT J
76ØØ FOR J=1 TO 2ØØ:NEXT:RETURN
8ØØØ REM PRINT BOARD
8Ø1Ø PRINT "ĥ";
8Ø9Ø FOR J=Ø TO 4: PRINT "→→→→→→";
81ØØ :FOR K=Ø TO 4
812Ø :  PRINT D$(J,K);: IF K<4 THEN ¬
      ¬PRINT "→→→→→";
```

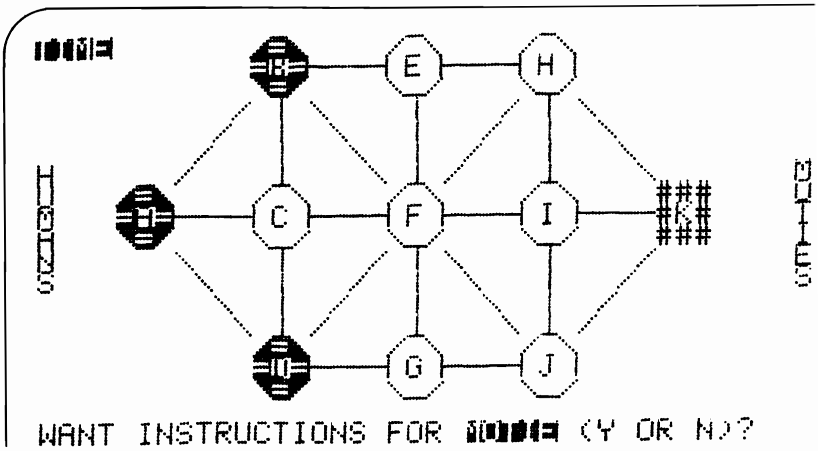
```
 813Ø :NEXT K
 814Ø :IF J<4 THEN PRINT "↓↓↓↓"
 815Ø NEXT J
 82ØØ RETURN
 9ØØØ REM INSTRUCTIONS
 911Ø PRINT "ĥ";
 92ØØ PRINT "YOU WIN AT r̲SQUAREr̂ BY ¬
        ¬PICKING FOUR↓"
 921Ø PRINT "LETTERS WHICH COULD BE ¬
        ¬CORNERS OF A↓"
 922Ø PRINT "SQUARE.  THE COMPUTER PLA
        ¬WELL, BUT↓"
 923Ø PRINT "NOT PERFECTLY, AND YOU ¬
        ¬r̲CANr̂ BEAT IT!!!"
 94ØØ XX$="PRESS r̲RETURNr̂ TO START..."
 95ØØ GOSUB 1ØØØØ:GOSUB 8ØØØ:RETURN
 1ØØØØ REM GET
 1Ø2ØØ PRINT "h̲";ZD$;XX$;
 1Ø3ØØ GET XA$:IF XA$<>"" THEN 1Ø3ØØ
 1Ø31Ø GET XA$:IF XA$="" THEN 1Ø31Ø
 1Ø33Ø PRINT ZZ$;"r̂"
 1Ø4ØØ RETURN
READY.
```

Motie

by Mac Oglesby

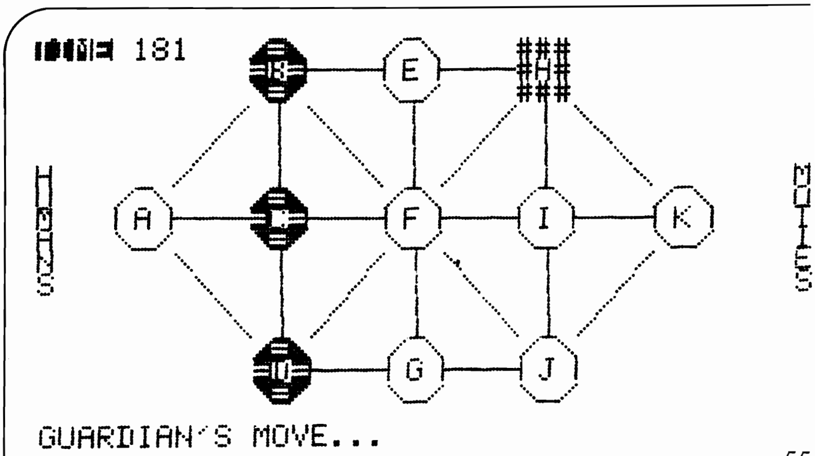
You have only 200 seconds in which to save the world. Our universe's only defense against the invading Moties are three Guardian starships. The moves they make during this cosmic life-and-death struggle are entirely up to you.

The Motie's starting position changes randomly with every game, so your defensive/offensive strategy had better be flexible. Here's an example of the beginning of a Motie assault:

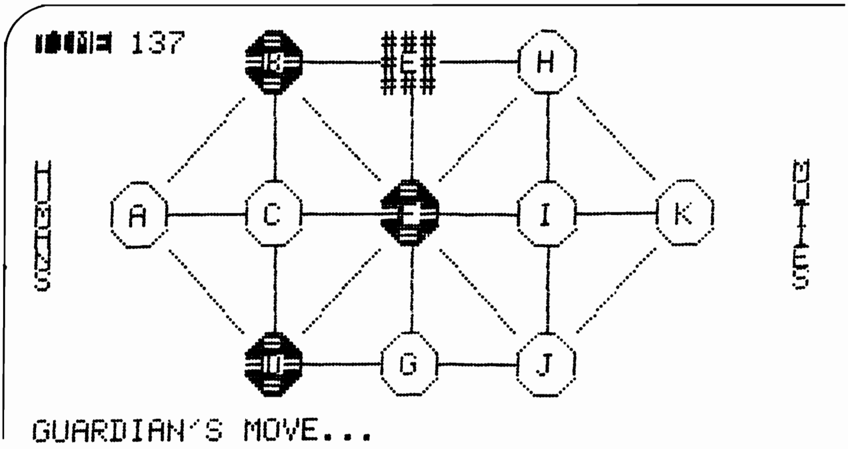


WANT INSTRUCTIONS FOR MOTIE (Y OR N)?

The Motie can go in any direction as it alternately attacks and evades. Your Guardian starships may move forward or sideways, but they can *never* move backwards. Once you've let the Motie penetrate your defenses there is no turning back, and time is running out!



GUARDIAN'S MOVE...

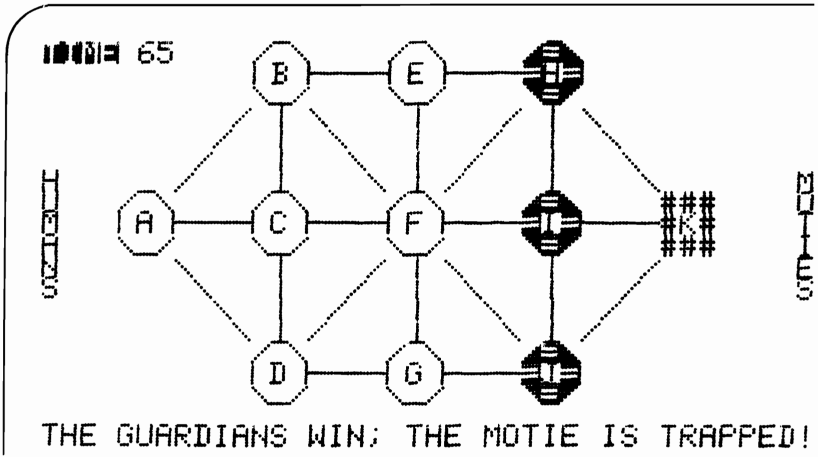


```
GUARDIAN'S MOVE...
```

The Motie wins (perish the thought!) if it reaches position A on your screen. The Guardians win if they can pin down the Motie and prevent it from moving, in 200 seconds or less.

The stakes for winning or losing this game have always been high—*Motie* is based on "The Soldier's Game," better known as the "French Military Game." During the Franco-Prussian War in the 1870s, French officers played this game to sharpen their strategic skills on the real battlefield.

In the original version, the invading forces win if they slip behind enemy lines, making it impossible for the guardians to pin them down, or if the opponents reach a stalemate during which they repeat the same moves endlessly (an accurate prediction of World War I).



```
THE GUARDIANS WIN; THE MOTIE IS TRAPPED!
```

Says Martin Gardner in *The Sixth Book of Mathematical Games from Scientific American*: "This game is as simple to learn as *Tic Tac Toe* but more exciting and difficult to analyze." There is no simple strategy. The best move could look like the worst, since "the game abounds in traps and surprises." Due to the serious nature of the consequences to Planet Earth, this is definitely a C game.

(Mac's inspiration for *Motie* is from an excellent science fiction novel: *The Mote in God's Eye* by Larry Niven and Jerry Pournelle.)

```
100 REM  *** MOTIE ***
110 REM
120 REM (C)MAC OGLESBY   2/2/8Ø
130 REM
14Ø REM COPYRIGHT 198Ø BY MAC OGLESBY
16Ø REM
17Ø REM CHANGED 3/29/8Ø: REMOVED LOWER
18Ø REM   CASE AND FIXED BUG LINE 422Ø.
19Ø REM CHANGED 5/11/8Ø: COUNTS DOWN
2ØØ REM
1ØØØ REM *** INITIALIZATION
1Ø1Ø POKE 59468,12: REM GRAPHICS MODE
1Ø2Ø TL=2ØØ: REM GAME TIME LIMIT IN ¬
      ¬SECS.
11ØØ DIM DN(11),RT(11),PE%(11,8),BD$(4)
12ØØ FOR J=1 TO 11: READ DN(J),RT(J):
      ¬ NEXT J
121Ø DATA 8,5,1,12,8,12,15,12,1,19,8,19
122Ø DATA 15,19,1,26,8,26,15,26,8,33
13ØØ REM
131Ø FOR J=1 TO 11: FOR K=1 TO 8
132Ø : READ PE%(J,K)
133Ø NEXT K: NEXT J
134Ø DATA 2,3,4,Ø,Ø,Ø,Ø,Ø
1342 DATA -1,3,5,6,Ø,Ø,Ø,Ø
1344 DATA -1,2,4,6,Ø,Ø,Ø,Ø
1346 DATA -1,3,6,7,Ø,Ø,Ø,Ø
1348 DATA -2,6,8,Ø,Ø,Ø,Ø,Ø
135Ø DATA -2,-3,-4,5,7,8,9,1Ø
1352 DATA -4,6,1Ø,Ø,Ø,Ø,Ø,Ø
1354 DATA -6,-5,9,11,Ø,Ø,Ø,Ø
1356 DATA -6,8,1Ø,11,Ø,Ø,Ø,Ø
1358 DATA -6,-7,9,11,Ø,Ø,Ø,Ø
136Ø DATA -8,-1Ø,-9,Ø,Ø,Ø,Ø,Ø
15ØØ GN$="r)=^↓←←←=→=↓←←←r̂^r=r̂)"
151Ø MT$="###↓←←←#→#↓←←←###"
152Ø EY$="N#M↓←←←%→'↓←←←M$N"
153Ø L1$="N↑N↑N↑N": L2$="M↓M↓M↓M":
      ¬ L3$="@@@@": L4$="l↓←l↓←l↓←l"
16ØØ DN$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
161Ø RT$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→→→"
162Ø DW$=LEFT$(DN$,18)
1624 REM
```

```
1630 DD$="
      ¬"
1640 REM LINE 1630 IS DD$=[40 DELETES]
1700 P$(1)="MOTIE'S"
1710 P$(2)="GUARDIAN'S"
1750 BD$(Ø)="GGOGOOOOOOO"
1760 BD$(1)="GGOGOOOOOOM"
1770 BD$(2)="OGOOMGOGOOO"
1780 BD$(3)="OOOGOGMOOGO"
1790 BD$(4)="OOOOOOOGGGM"
1820 GOSUB 8ØØØ
1840 XX$="WANT INSTRUCTIONS FOR r̲MOTIEr̂ ¬
      ¬(Y OR N)?"
1850 GOSUB 1ØØØØ
1860 IF XA$<>"Y" THEN 19ØØ
1870 GOSUB 9ØØØ: GOSUB 8ØØØ
1900 BD$(1)=BD$(Ø)
2000 GOSUB 86ØØ
2100 XX$="HOW MANY HUMAN PLAYERS (1 OR ¬
      ¬2)?"
2110 GOSUB 1ØØØØ
2120 IF XA=2 THEN PL=2: GOTO 22ØØ
2130 IF XA=1 THEN PL=1: GOTO 216Ø
2140 XX$="r̲"+XX$: GOTO 211Ø
2160 X=3+INT(RND(1)*9): IF X=4 THEN 216Ø
2190 GOTO 232Ø
2200 XX$="WHERE IS THE MOTIE SHIP FIRST ¬
      ¬SPOTTED?"
2210 GOSUB 1ØØØØ
2220 IF XA$>"D" AND XA$<"L" OR XA$="C" ¬
      ¬THEN 225Ø
2230 XX$="PICK FROM LOCATIONS r̲Cr̂ r̲Er̂ ¬
      ¬r̲Fr̂ r̲Gr̂ r̲Hr̂ r̲Ir̂ r̲Jr̂ r̲K": GOTO 221Ø
2250 X=ASC(XA$)-64
2320 BD$(1)=LEFT$(BD$(Ø),X-1)+"M"+MID$(B
      ¬D$(Ø),X+1,11-X)
2330 TN=1
2340 TI$="ØØØØØØ"
2400 GOSUB 86ØØ
3000 REM ** GAME LOOP
3010 BD$(Ø)=BD$(1)
3100 TN=3-TN
3110 IF PL=2 OR TN=2 THEN 4ØØØ
3200 REM COMPUTER MOVES MOTIE
```

```
33ØØ FOR J=1 TO 11
331Ø : IF MID$(BD$(Ø),J,1)="M" THEN 335Ø
332Ø NEXT J
335Ø FOR K=1 TO 8
336Ø : X=ABS(PE%(J,K)): IF X<1 THEN 338Ø
337Ø : IF MID$(BD$(Ø),X,1)="O" THEN 34ØØ
338Ø NEXT K
34ØØ IF BD$(Ø)="OOOOGGOMOGO" THEN X=11
341Ø IF BD$(Ø)="OOOOOGGGOMO" THEN X=11
35ØØ GOTO 5ØØØ
4ØØØ REM GET HUMAN'S MOVE
4Ø5Ø XX$=P$(TN)+" MOVE..."
4Ø55 PRINT "h̲";LEFT$(DN$,2Ø);RT$;DD$
4Ø6Ø GOSUB 1ØØØØ
4Ø7Ø A$=""
4Ø8Ø IF XA$<"A" OR XA$>"K" THEN XA$="Z"
41ØØ IF TN=2 THEN 42ØØ
411Ø FOR J=2 TO 11
412Ø : IF MID$(BD$(Ø),J,1)="M" THEN ¬
      ¬A$=CHR$(J+64): GOTO 46ØØ
413Ø NEXT J
42ØØ REM CHECK IF LEGAL MOVE
421Ø IF MID$(BD$(Ø),ASC(XA$)-64,
      ¬1)=LEFT$(P$(TN),1) THEN 428Ø
422Ø FOR J=1 TO 11
423Ø : IF MID$(BD$(Ø),J,1)<>"G" THEN ¬
      ¬425Ø
424Ø : A$=A$+" r̲"+CHR$(64+J)+"r̂"
425Ø NEXT J
426Ø XX$="GUARDIANS ARE AT"+A$
427Ø GOTO 4Ø6Ø
428Ø A$=XA$
43ØØ J=ASC(A$)-64
431Ø FOR K=1 TO 8
432Ø : Z=PE%(J,K): IF Z<1 THEN 437Ø
433Ø : IF MID$(BD$(Ø),Z,1)="O" THEN 442Ø
437Ø NEXT K
438Ø XX$="THAT GUARDIAN CAN'T MOVE.  ¬
      ¬TRY ANOTHER."
439Ø GOTO 4Ø6Ø
442Ø XX$="MOVE r̲"+A$+"r̂ WHERE?"
443Ø PRINT "h̲";LEFT$(DN$,2Ø);"PRESS r̲Xr̂ ¬
      ¬TO CANCEL A MOVE."
```

```
4500 GOSUB 10000
4510 IF XA$="X" THEN 4000
4530 IF XA$<"A" OR XA$>"K" THEN XA$="Z"
4590 J=ASC(A$)-64
4600 X=ASC(XA$)-64
4605 B$=""
4610 FOR K=1 TO 8
4620 : Z=PE%(J,K): IF TN=1 THEN Z=ABS(Z)
4630 : IF Z<1 THEN 4690
4650 : IF MID$(BD$(0),Z,1)<>"O" THEN ¬
      ¬4690
4660 : IF Z=X THEN 5000
4670 : B$=B$+" r̲"+CHR$(Z+64)+"r̂"
4690 NEXT K
4700 IF LEN(B$)>4 THEN 4800
4710 XX$="r̲"+A$+"r̂ CAN ONLY MOVE TO "+B$
4720 GOTO 4500
4800 XX$="LEGAL MOVES FOR r̲"+A$+"r̂ ¬
      ¬ARE"+B$
4810 GOTO 4500
5000 REM *** UPDATE BOARD & CHECK FOR ¬
      ¬END
5050 PRINT "h̲";DW$;RT$;DD$;"↓↓";RT$;DD$
5100 BD$(1)=""
5110 FOR K=1 TO 11
5120 : IF K<>J AND K<>X THEN 5180
5130 : IF K=J THEN BD$(1)=BD$(1)+"O":
      ¬ GOTO 5200
5140 : BD$(1)=BD$(1)+LEFT$(P$(TN),1):
      ¬ GOTO 5200
5180 : BD$(1)=BD$(1)+MID$(BD$(0),K,1)
5200 NEXT K
5210 GOSUB 8600
5290 IF X=1 THEN A$="HEAVEN HELP US!  ¬
      ¬THE MOTIES ARE LOOSE!!!": GOTO ¬
      ¬7000
5300 FOR J=2 TO 4
5310 : IF BD$(1)<>BD$(J) THEN 5400
5320 : A$="THE GUARDIANS WIN; THE MOTIE ¬
      ¬IS TRAPPED!": GOTO 7000
5400 NEXT J
5500 GOTO 3000
7000 REM
```

```
7100 FOR J=1 TO 3
7110 : POKE 59409,52: REM SCREEN OFF
7120 : FOR K=1 TO 300: NEXT K: REM DELAY
7130 : POKE 59409,60: REM SCREEN ON
7140 : FOR K=1 TO 300: NEXT K
7150 NEXT J
7200 PRINT "h̲";DW$;RT$;DD$
7300 FOR J=1 TO 6
7310 : PRINT "h̲";DW$;
7320 : PRINT A$;
7330 : FOR K=1 TO 300: NEXT K
7340 : IF J/2=INT(J/2) THEN PRINT "r̂";:
      ¬ GOTO 7350
7345 PRINT "r̲";
7350 NEXT J
7400 PRINT
7500 PRINT "r̂"
7510 PRINT "PRESS  r̲RETURNr̂  TO PLAY ¬
      ¬AGAIN..."
7520 PRINT
7530 PRINT "PRESS ANY OTHER KEY TO ¬
      ¬STOP."
7540 TN=Ø
7600 GOSUB 1Ø130
7610 IF ASC(XA$)<>13 THEN PRINT "ĥ": END
7620 RUN
8000 REM *** PRINT BOARD
8100 PRINT "ĥ";
8200 PRINT "↓↓↓↓↓↓H↓←U↓←M↓←A↓←N↓←S"
8210 PRINT "h̲";LEFT$(RT$,39);"↓↓↓↓↓↓M↓←O
      ¬↓←T↓←I↓←E↓←S"
8400 PRINT "h̲↓→→→→→→→→→→→→→→";L3$;"→→→";
      ¬L3$
8410 PRINT "h̲↓↓↓↓↓↓→→→→→→→";L1$;"→→→";L2
      ¬$;"→→→";L1$;"→→→";L2$
8420 PRINT "h̲↓↓↓↓↓↓↓↓→→→→→→→";L3$;"→→→";
      ¬L3$;"→→→";L3$;"→→→";L3$
8430 PRINT "h̲↓↓↓↓↓↓↓↓↓↓→→→→→→→";L2$;"→→→
      ¬";L1$;"→→→";L2$;"→→→";L1$
8440 PRINT "h̲↓↓↓→→→→→→→→→→→→";L4$;"↓↓↓↓←
      ¬";L4$;"↓↓→";L3$
8450 PRINT "h̲↓↓↓→→→→→→→→→→→→→→→→→→→";L4$
      ¬;"↓↓↓↓←";L4$;"↓↓→";L3$
```

```
8460 PRINT "h̲↓↓↓→→→→→→→→→→→→→→→→→→→→→→→→
     ¬→→";L4$;"↓↓↓↓←";L4$
8500 PRINT "h̲r̲TIME"
8600 FOR J=1 TO 11: REM HERE TO UPDATE ¬
     ¬THE BOARD
8610 PRINT "h̲";
8620 PRINT LEFT$(DW$,DN(J)); LEFT$(RT$,
     ¬RT(J));
8650 PRINT "↑←";
8660 IF MID$(BD$(1),J,1)="G" THEN PRINT ¬
     ¬GN$;
8670 IF MID$(BD$(1),J,1)="O" THEN PRINT ¬
     ¬EY$;
8680 IF MID$(BD$(1),J,1)="M" THEN PRINT ¬
     ¬MT$;
8700 PRINT "↑←←";CHR$(64+J)
8800 NEXT J
8900 RETURN
9000 REM *** INSTRUCTIONS
9010 PRINT "ĥ";
9020 PRINT "↓GUARDIANS↓"
9030 PRINT GN$;"→→↑↑";GN$;"→→↑↑";GN$
9040 PRINT "↓↓MOTIE↓"
9050 PRINT MT$
9060 XX$="": GOSUB 10110
9100 PRINT "ĥ";
9300 PRINT "   THREE r̲GUARDIANr̂ ¬
     ¬STARSHIPS PROTECT THE↓"
9310 PRINT "HUMAN WORLDS FROM THE ¬
     ¬r̲MOTIEr̂ SHIP.  THE↓"
9320 PRINT "r̲MOTIESr̂ WIN IF THEY REACH ¬
     ¬LOCATION r̲Ar̂.↓"
9330 PRINT "THE r̲GUARDIANSr̂ WIN BY ¬
     ¬TRAPPING THE r̲MOTIEr̂↓"
9340 PRINT "SO IT CAN'T MOVE."
9350 GOSUB 10110
9360 PRINT "ĥ   r̲GUARDIANSr̂ AND THE ¬
     ¬r̲MOTIEr̂ MOVE ALONG↓"
9370 PRINT "THE PATHWAYS SHOWN.  THE ¬
     ¬r̲MOTIEr̂ CAN GO IN"
9380 PRINT "ANY DIRECTION, WHILE THE ¬
     ¬r̲GUARDIANSr̂ CAN'T"
9390 PRINT "MOVE BACKWARD (LEFT).  ¬
     ¬THERE ARE NO↓"
```

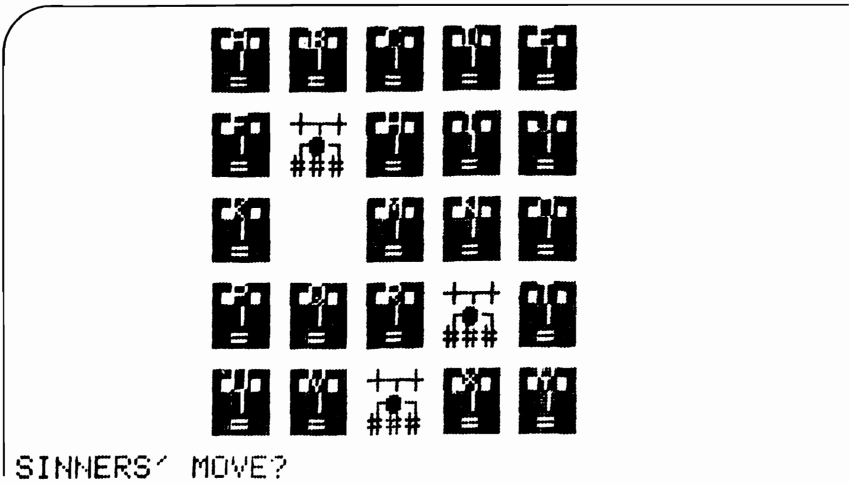
```
 94ØØ PRINT "JUMPS OR CAPTURES.↓"
 941Ø PRINT
 942Ø PRINT "YOU WILL HAVE";TL;"SECONDS. ¬
      ¬ r̲GOOD LUCK!r̂"
 97ØØ GOSUB 1Ø11Ø
 99ØØ RETURN
 1ØØØØ REM GET 1 CHR
 1Ø1ØØ PRINT "h̲";DW$;RT$;DD$;: REM DD$ ¬
       ¬IS 4Ø DELETES
 1Ø11Ø PRINT "h̲";DW$;: REM DW$ IS 18 ¬
       ¬CRSR DOWNS
 1Ø12Ø IF XX$="" THEN XX$="PRESS ¬
       ¬r̲RETURNr̂ TO CONTINUE."
 1Ø125 PRINT XX$;
 1Ø13Ø GET XA$: IF XA$<>"" THEN 1Ø13Ø:
       ¬ REM EMPTY BUFFER
 1Ø131 IF TN=Ø THEN 1Ø14Ø: REM SKIP THE ¬
       ¬TIME
 1Ø132 GET XA$: PRINT "h̲→→→→";: TE=INT(TI
       ¬/6Ø): PRINT STR$(TL-TE);"  "
 1Ø134 IF TE=>TL THEN A$="YOU'VE RUN OUT ¬
       ¬OF TIME...": GOTO 7ØØØ
 1Ø138 IF XA$="" THEN 1Ø132
 1Ø139 GOTO 1Ø15Ø
 1Ø14Ø GET XA$: IF XA$="" THEN 1Ø14Ø
 1Ø15Ø XA=VAL(XA$)
 1Ø16Ø PRINT "r̂";
 1Ø17Ø RETURN
READY.
```

Sinners

by Mac Oglesby

Sinners gives you an idea of what the world will be like if you let the Moties take over. Your playing field is Purgatory—condemned Sinners (moved by you) vs. three of Satan's Fiends. These Fiends thrive on gobbling up Sinners. You win if you can get the Fiends into a straight line—horizontal or vertical. You lose if you leave the Fiends without any Sinners to pounce on. (Not that there's much hope for a condemned Sinner, but things could always get worse.)

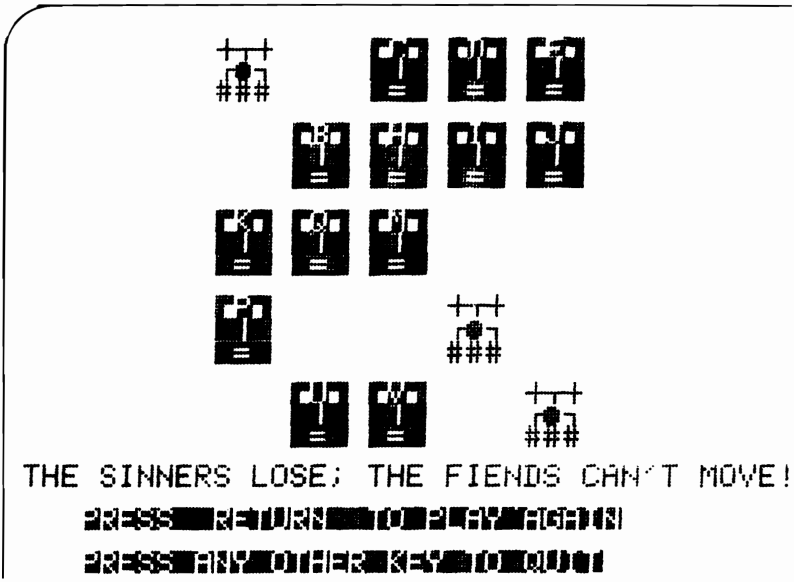
You have 25 spaces to work with, in five rows of five columns. The Sinners are represented by letters. The three Fiends (easily recognizable by their squat appearance) change their starting position randomly with each game.



SINNERS' MOVE?

There are no jumps or diagonal moves in this game. The Sinners can move into any adjacent empty space (up, down, left, right). You type the letter that represents the Sinner you wish to move and the first letter of the direction in which you want it to move. For example, if you're moving Sinner B one space up, you type BU. For down, type BD; for left, type BL; and for a move to the right, type BR.

The Fiends can devour any adjacent sinner by moving into its space and gobbling it up. Woe betide the player who leaves three hungry Fiends scattered about the board without any Sinners to feed them: He or she has lost! We won't tell you how to win this game by getting the three Fiends into a vertical or horizontal line. We will show you one way to lose!



```
THE SINNERS LOSE; THE FIENDS CAN'T MOVE!
     PRESS RETURN TO PLAY AGAIN
     PRESS ANY OTHER KEY TO QUIT
```

```
100 REM  NAME:  SINNERS
105 REM
110 REM  (C)  MAC OGLESBY   9/30/79
112 REM    LAST REVISED ON 2/4/80
115 REM
120 REM  COPYRIGHT 1980 BY MAC OGLESBY
130 REM  PERMISSION GRANTED TO USE,
140 REM  NOT TO SELL THIS PROGRAM.
145 REM
150 REM  THREE OF SATAN'S FIENDS PLAY
160 REM  AGAINST A GROUP OF SINNERS.
170 REM  A GAME FOR A PET COMPUTER
180 REM  BASED ON GAME BY HAAR HOOLIM
190 REM  DESCRIBED IN SID SACKSON'S "A
200 REM  GAMUT OF GAMES."
210 REM
1000 REM ***INITIALIZATION
1010 POKE 59468,12:REM GRAPHICS MODE
1100 DIM D(6,6),P(12,6),M(4),R(4),C(4),
       ¬H(2,3),U(4)
1105 R$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
1106 C$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→"
1107 SP$="                               ¬
       ¬         "
1110 FOR J=1 TO 4: READ M(J),R(J),C(J):
       ¬ NEXT J
1120 DATA 85,-1,0,82,0,1,68,1,0,76,0,-1
1130 FOR J=1 TO 5: FOR K=1 TO 5:
       ¬ D(J,K)=64+(J-1)*5+K: NEXT K:
       ¬ NEXT J
1140 FOR I=1 TO 2: FOR J=1 TO 3
1150 : H(I,J)=1+INT(5*RND(1))
1160 : FOR K=1 TO J-1
1170 :   IF K<J THEN IF H(I,J)=H(I,
       ¬K) THEN 1150
1180 : NEXT K
1190 NEXT J: NEXT I
1200 FOR J=1 TO 3: D(H(1,J),H(2,J))=666:
       ¬ NEXT J
1210 S1$="r,A;↓<<< B ↓<<< = r̂"
1215 S2$="r,Z;↓<<< B ↓<<< = r̂"
1220 FD$="[2[↓<<<ØO.↓<<<###"
```

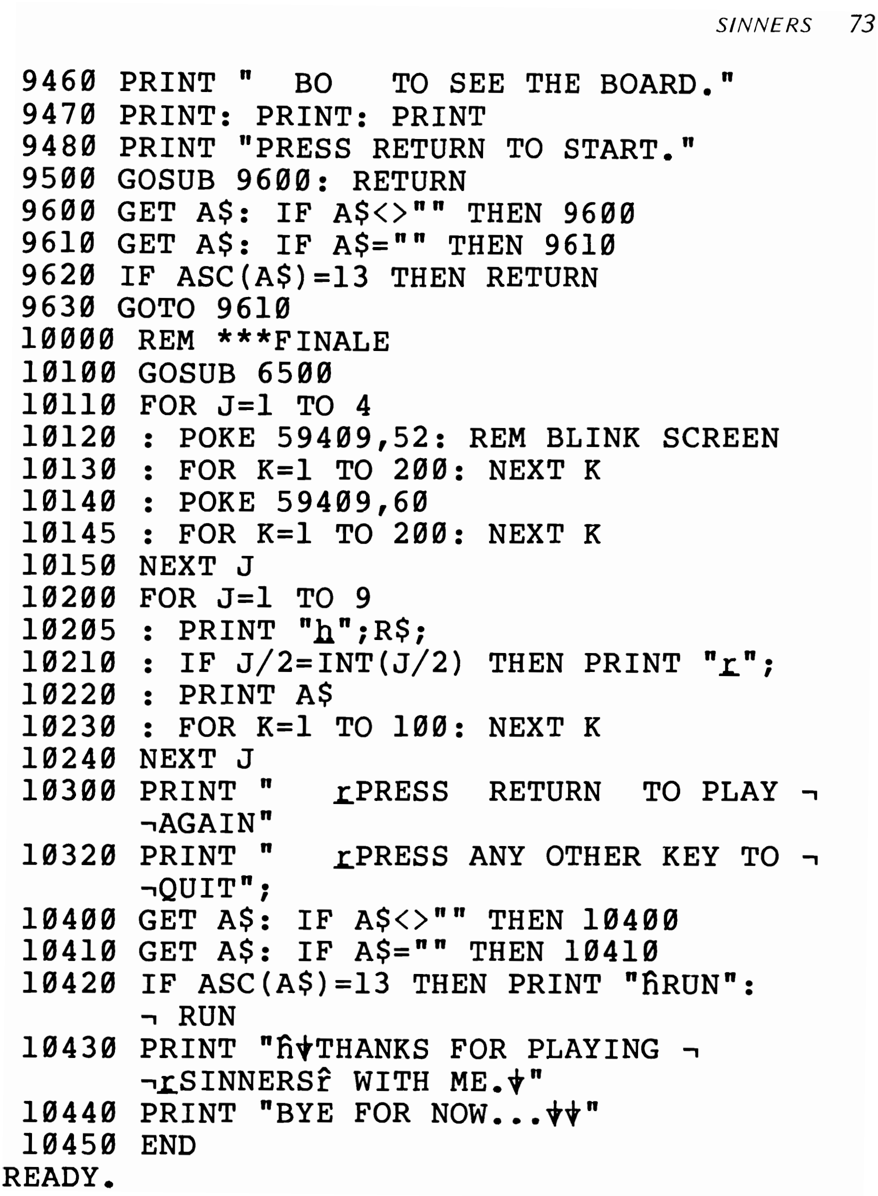
```
1230 PRINT "ĥ→→→→→→→→→→→→→";S1$;"→↑↑";FD
      ¬$;"→↑↑";S2$;"↓↓↓"
1240 PRINT "WELCOME TO  ↓↓↓↓↓S I N N E ¬
      ¬R S"
1250 PRINT "↓↓↓↓↓↓↓↓WANT INSTRUCTIONS ¬
      ¬(YES OR NO)? ";
1255 GOSUB 6ØØØ
126Ø IF B$="NO" THEN 13ØØ
127Ø IF B$="YS" THEN GOSUB 9ØØØ:
      ¬ GOTO 13ØØ
1275 PRINT
128Ø PRINT "PLEASE TYPE  YES  OR  NO ";:
      ¬GOTO 1255
13ØØ GOSUB 8ØØØ
2ØØØ REM ***GENERATE COMPUTER'S MOVE
21ØØ MO=Ø
211Ø FOR J=1 TO 5: FOR K=1 TO 5
212Ø : IF D(J,K)<>666 THEN 218Ø
213Ø : FOR L=1 TO 4
214Ø :   IF D(J+R(L),K+C(L))<65 OR ¬
      ¬D(J+R(L),K+C(L))>89 THEN 217Ø
215Ø :     MO=MO+1: P(MO,1)=J: P(MO,2)=K
216Ø :     P(MO,3)=J+R(L): P(MO,
      ¬4)=K+C(L)
217Ø : NEXT L
218Ø NEXT K: NEXT J
219Ø IF MO>Ø THEN 225Ø
22ØØ A$="THE SINNERS LOSE; THE FIENDS ¬
      ¬CAN'T MOVE!": GOTO 1ØØØØ
225Ø PRINT "NOW, I'LL MOVE A FIEND..."
23ØØ SC=SC+1
231Ø FOR I=1 TO 3: FOR J=MO TO 1 STEP-1
232Ø : T9=1+INT(J*RND(1))
2325 : TEMP=D(P(T9,3),P(T9,4))
233Ø : D(P(T9,1),P(T9,2))=32
2335 :   FR=P(T9,1): FC=P(T9,2)
234Ø : D(P(T9,3),P(T9,4))=666
2345 :   NR=P(T9,3): NC=P(T9,4)
235Ø : IF I<3 THEN 24ØØ
236Ø :   GOSUB 85ØØ: A$="THE SINNERS ¬
      ¬ARE WINNERS...": GOTO 1ØØØØ
24ØØ : FOR K=1 TO 5
```

```
2410 :   R9=0: C9=0
2420 :   FOR L=1 TO 5
2430 :     IF D(K,L)=666 THEN R9=R9+1:
     ¬ IF R9>I THEN 2500
2440 :     IF D(L,K)=666 THEN C9=C9+1:
     ¬ IF C9>I THEN 2500
2450 :   NEXT L
2460 : NEXT K
2475 : GOSUB 8500: GOSUB 6500: IF SC<22 ¬
     ¬THEN 3000
2480 : A$="NO MORE SINNERS...": GOTO ¬
     ¬10000
2500 : D(P(T9,1),P(T9,2))=666
2510 : D(P(T9,3),P(T9,4))=TEMP
2520 : IF T9=J THEN 2560
2530 :   FOR J0=1 TO 4: U(J0)=P(J,J0):
     ¬ NEXT J0
2540 :   FOR J0=1 TO 4: P(J,J0)=P(T9,
     ¬J0): NEXT J0
2550 :   FOR J0=1 TO 4: P(T9,J0)=U(J0):
     ¬ NEXT J0
2560 NEXTJ: NEXT I
3000 REM ***PLAYER'S MOVE
3100 PRINT "SINNERS' MOVE? ";
3110 GOSUB 6000
3200 IF B$="IN" THEN GOSUB 9000:
     ¬ GOSUB 8000: GOTO 3100
3210 IF B$="HE" THEN GOSUB 6500:
     ¬ GOSUB 7000: GOTO 3100
3220 IF B$="RE" THEN A$="THE SINNERS ¬
     ¬GIVE UP...": GOTO 10000
3230 IF B$="BO" THEN GOSUB 8000:
     ¬ GOTO 3100
3260 SR=ASC(LEFT$(B$,1))
3300 FOR J=1 TO 5: FOR K=1 TO 5
3310 : IF D(J,K)=SR THEN R=J: C=K:
     ¬ GOTO 3360
3320 NEXT K: NEXT J
3330 GOTO 3500
3360 DR=ASC(RIGHT$(B$,1))
3400 FOR J=1 TO 4
3410 : IF DR<>M(J) THEN 3450
```

```
342Ø :   IF D(R+R(J),C+C(J))<>32 THEN ¬
      ¬35ØØ
343Ø :     D(R+R(J),C+C(J))=D(R,C):
      ¬ D(R,C)=32
3435 :     FR=R: FC=C: NR=R+R(J):
      ¬ NC=C+C(J)
344Ø :     GOSUB 85ØØ: GOSUB 65ØØ:
      ¬ GOTO 2ØØØ
345Ø NEXT J
35ØØ GOSUB65ØØ
351Ø PRINT "THAT'S NOT A LEGAL MOVE.  ¬
      ¬TYPE  HE  FOR ";
352Ø PRINT "HELP.  TYPE  IN  FOR ¬
      ¬INSTRUCTIONS."
354Ø GOTO 31ØØ
6ØØØ REM ***GET PLAYER'S INPUT
6Ø1Ø B$=""
6Ø2Ø GET A$: IF A$<>"" THEN 6Ø2Ø:
      ¬ CLEAR BUFFER
61ØØ GET A$: IF A$="" THEN 61ØØ
611Ø IF ASC(A$)=13 THEN PRINT "↑";
612Ø PRINT A$;: B$=B$+A$
613Ø IF LEN(B$)=1 THEN 61ØØ
614Ø IF B$="YE" THEN B$="Y": GOTO 61ØØ
615Ø FOR J=1 TO 1ØØ: NEXT J: RETURN
65ØØ REM ***CLEAR BOTTOM OF SCREEN
66ØØ PRINT "h";R$;
661Ø FOR J=1 TO 5: PRINT SP$;: NEXT J
662Ø PRINT "h";R$;
663Ø RETURN
7ØØØ REM ***HELP
7Ø1Ø GOSUB 65ØØ
71ØØ PRINT "LEGAL MOVES:";
711Ø FOR J=1 TO 5: FOR K=1 TO 5
712Ø : IF D(J,K)<65 OR D(J,K)>89 THEN ¬
      ¬716Ø
713Ø :   FOR L=1 TO 4
714Ø :     IF D(J+R(L),K+C(L))=32 THEN ¬
      ¬PRINT " ";CHR$(D(J,K));CHR$(M(L));
715Ø :   NEXT L
716Ø NEXT K: NEXT J
717Ø PRINT
```

```
7200 RETURN
8000 REM ***PRINT THE BOARD
8100 PRINT "ĥ";
8110 FOR J=1 TO 5: PRINT "→→→→→→→→→→→";
8120 : FOR K=1 TO 5
8125 :   IF D(J,K)=32 THEN PRINT ¬
      ¬"→→→↓↓";: GOTO 8160
8130 :   IF D(J,K)=666 THEN PRINT FD$;:
      ¬ GOTO 8160
8140 :   PRINT "r̲,̲";CHR$(D(J,K));"i̲↓←←← ¬
      ¬l̲ ↓←←← = r̂";
8160 :   IF K<5 THEN PRINT "→↑↑";
8170 : NEXT K
8180 : PRINT "↓"
8190 NEXT J: RETURN
8500 REM ***MOVE THE PIECES
8600 PRINT"h̲";LEFT$(R$,FR*4-3);"↑";LEFT$
      ¬(C$,FC*4+6);
8610 PRINT "   ↓←←←   ↓←←←   "
8620 PRINT "h̲";LEFT$(R$,NR*4-3);"↑";LEFT
      ¬$(C$,NC*4+6);
8630 IF D(NR,NC)=666 THEN PRINT FD$:
      ¬ RETURN
8650 PRINT "r̲,̲";CHR$(D(NR,NC));"i̲↓←←← l̲ ¬
      ¬↓←←← = r̂": RETURN
9000 REM ***INSTRUCTIONS
9100 PRINT "ĥTHREE OF SATAN'S FIENDS ¬
      ¬(MOVED BY THE"
9110 PRINT "COMPUTER) PLAY AGAINST A ¬
      ¬GROUP OF CON-"
9120 PRINT "DEMNED SINNERS (MOVED BY ¬
      ¬YOU)."
9130 PRINT
9140 PRINT "THE PLAYING FIELD HAS 25 ¬
      ¬SPACES,"
9150 PRINT "5 ROWS OF 5 COLUMNS."
9160 PRINT
9170 PRINT "A SINNER MAY MOVE INTO ANY ¬
      ¬ADJACENT"
9180 PRINT "EMPTY SPACE.  A FIEND MOVES ¬
      ¬INTO AN"
```

```
9190 PRINT "ADJACENT SPACE WHICH ¬
      ¬CONTAINS A SINNER,"
9200 PRINT "WHO IS THEREBY CAPTURED AND ¬
      ¬REMOVED."
9210 PRINT "THERE ARE NO DIAGONAL MOVES ¬
      ¬AND NO"
9220 PRINT "JUMPS."
9230 PRINT
9240 PRINT "THE SINNERS WIN IF ALL ¬
      ¬FIENDS ARE IN"
9250 PRINT "A LINE HORIZONTALLY OR ¬
      ¬VERTICALLY."
9260 PRINT "THE SINNERS LOSE IF THE ¬
      ¬FIENDS, AT"
9270 PRINT "THEIR TURN, CAN'T CAPTURE A ¬
      ¬SINNER."
9280 PRINT: PRINT: PRINT
9290 PRINT "PRESS RETURN TO CONTINUE..."
      ¬;
9300 GOSUB 9600
9310 PRINT "ĥ  U": PRINT
9320 PRINT "L + R": PRINT
9330 PRINT "  D": PRINT
9340 PRINT
9350 PRINT "TO MOVE A SINNER, TYPE TWO ¬
      ¬LETTERS:"
9360 PRINT "THE LETTER NAMING THE ¬
      ¬SINNER AND THE"
9370 PRINT "LETTER TELLING THE DIRECTION
      ¬ TO GO."
9380 PRINT
9390 PRINT "FOR EXAMPLE,  JU  MEANS ¬
      ¬SINNER  J"
9400 PRINT "WANTS TO MOVE  UP."
9410 PRINT
9420 PRINT "FINALLY, AT YOUR TURN YOU ¬
      ¬MAY TYPE:"
9425 PRINT
9430 PRINT "  RE   TO RESIGN"
9440 PRINT "  IN   FOR THESE INSTRUCTION
      ¬S"
9450 PRINT "  HE   FOR A LIST OF LEGAL ¬
      ¬MOVES"
```



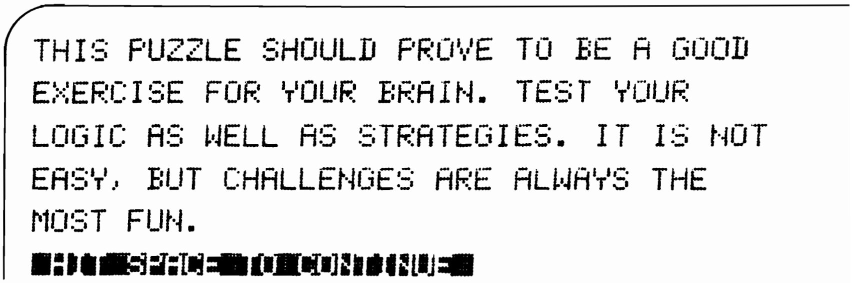
```
 946Ø PRINT "  BO   TO SEE THE BOARD."
 947Ø PRINT: PRINT: PRINT
 948Ø PRINT "PRESS RETURN TO START."
 95ØØ GOSUB 96ØØ: RETURN
 96ØØ GET A$: IF A$<>"" THEN 96ØØ
 961Ø GET A$: IF A$="" THEN 961Ø
 962Ø IF ASC(A$)=13 THEN RETURN
 963Ø GOTO 961Ø
 1ØØØØ REM ***FINALE
 1Ø1ØØ GOSUB 65ØØ
 1Ø11Ø FOR J=1 TO 4
 1Ø12Ø : POKE 594Ø9,52: REM BLINK SCREEN
 1Ø13Ø : FOR K=1 TO 2ØØ: NEXT K
 1Ø14Ø : POKE 594Ø9,6Ø
 1Ø145 : FOR K=1 TO 2ØØ: NEXT K
 1Ø15Ø NEXT J
 1Ø2ØØ FOR J=1 TO 9
 1Ø2Ø5 : PRINT "h̲";R$;
 1Ø21Ø : IF J/2=INT(J/2) THEN PRINT "r̲";
 1Ø22Ø : PRINT A$
 1Ø23Ø : FOR K=1 TO 1ØØ: NEXT K
 1Ø24Ø NEXT J
 1Ø3ØØ PRINT "    r̲PRESS  RETURN  TO PLAY ¬
       ¬AGAIN"
 1Ø32Ø PRINT "    r̲PRESS ANY OTHER KEY TO ¬
       ¬QUIT";
 1Ø4ØØ GET A$: IF A$<>"" THEN 1Ø4ØØ
 1Ø41Ø GET A$: IF A$="" THEN 1Ø41Ø
 1Ø42Ø IF ASC(A$)=13 THEN PRINT "ĥRUN":
       ¬ RUN
 1Ø43Ø PRINT "ĥ↓THANKS FOR PLAYING ¬
       ¬r̲SINNERSr̂ WITH ME.↓"
 1Ø44Ø PRINT "BYE FOR NOW...↓↓"
 1Ø45Ø END
READY.
```

Brainbuster

by Len Lindsay

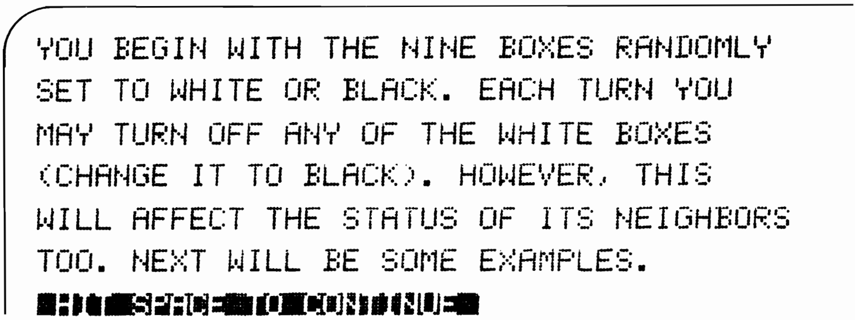
Since you've advanced this far, we wanted to give you a real *Brainbuster*. You can spend hours on this puzzle (you probably will!). Even author Len Lindsay spent several days busting his own brain on this, and he still can't guarantee a win within eleven moves every time he plays.

Brainbuster really tests your ability to plan ahead. Every move you make has far-reaching consequences. This game stretches your strategic skills—try it on your Logic class for size. It's good for your brain (and you deserve to have a swelled head when you figure it out). Here it is:

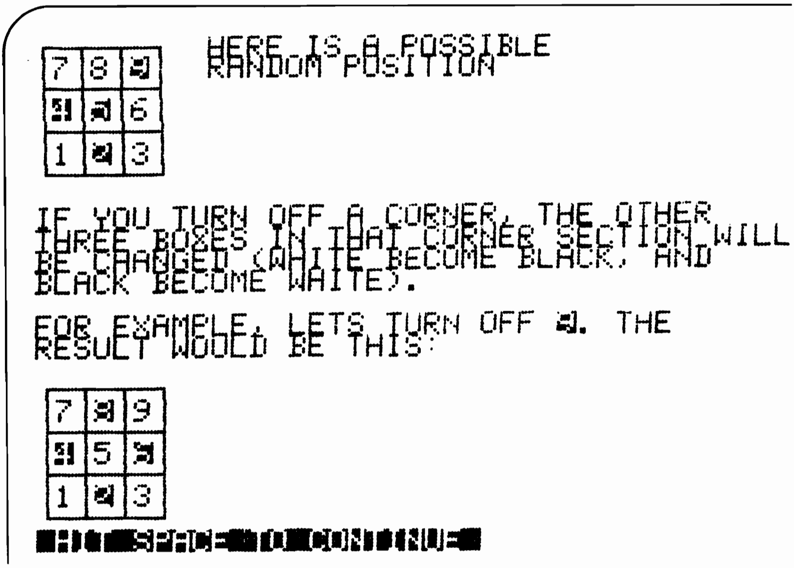


```
THIS PUZZLE SHOULD PROVE TO BE A GOOD
EXERCISE FOR YOUR BRAIN. TEST YOUR
LOGIC AS WELL AS STRATEGIES. IT IS NOT
EASY, BUT CHALLENGES ARE ALWAYS THE
MOST FUN.
[illegible]
```

Nine boxes are randomly set to black or white. The winning position, tantalizingly displayed in the lower right-hand corner of your screen, is to achieve eight white boxes with *only one black box* in the center:



```
YOU BEGIN WITH THE NINE BOXES RANDOMLY
SET TO WHITE OR BLACK. EACH TURN YOU
MAY TURN OFF ANY OF THE WHITE BOXES
(CHANGE IT TO BLACK). HOWEVER, THIS
WILL AFFECT THE STATUS OF ITS NEIGHBORS
TOO. NEXT WILL BE SOME EXAMPLES.
[illegible]
```



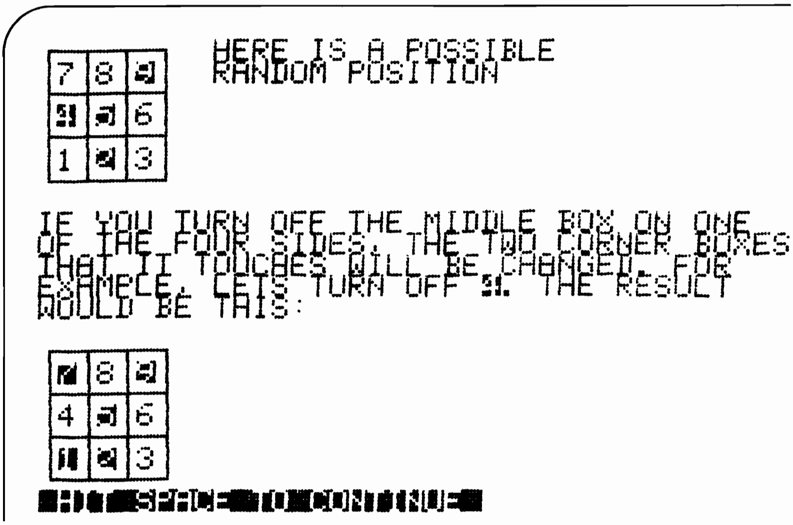
```
7 8 9     HERE IS A POSSIBLE
4 5 6     RANDOM POSITION
1 2 3
```

IF YOU TURN OFF A CORNER, THE OTHER THREE BOXES IN THAT CORNER SECTION WILL BE CHANGED (WHITE BECOME BLACK, AND BLACK BECOME WHITE).

FOR EXAMPLE, LETS TURN OFF 9. THE RESULT WOULD BE THIS:

```
7 8 9
4 5 6
1 2 3
```

PRESS SPACE TO CONTINUE

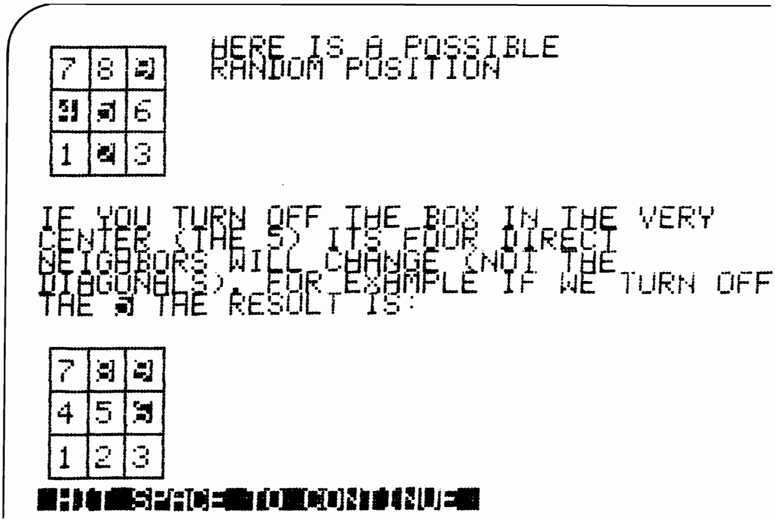


```
7 8 9     HERE IS A POSSIBLE
4 5 6     RANDOM POSITION
1 2 3
```

IF YOU TURN OFF THE MIDDLE BOX ON ONE OF THE FOUR SIDES, THE TWO CORNER BOXES THAT IT TOUCHES WILL BE CHANGED. FOR EXAMPLE, LETS TURN OFF 4. THE RESULT WOULD BE THIS:

```
7 8 9
4 5 6
1 2 3
```

PRESS SPACE TO CONTINUE



HERE IS A POSSIBLE
RANDOM POSITION

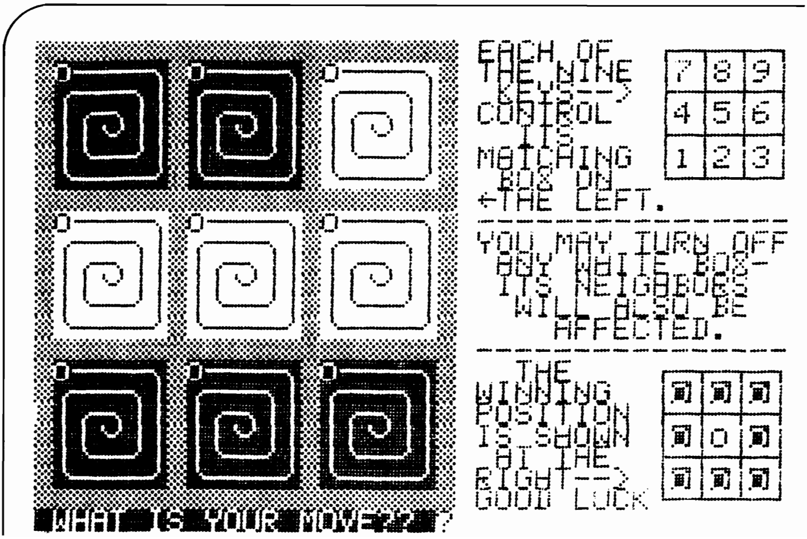
7	8	9
4	5	6
1	2	3

IF YOU TURN OFF THE BOX IN THE VERY CENTER (THE 5) ITS FOUR DIRECT NEIGBBORS WILL CHANGE (NOT THE DIAGONALS). FOR EXAMPLE IF WE TURN OFF THE 5 THE RESULT IS:

7	8	9
4	5	6
1	2	3

HIT SPACE TO CONTINUE

Remember: our printer reverses black and white, so whatever appears black on these pages would be white on the screen.



EACH OF THE NINE KEYS--> CONTROL ITS MATCHING BOX ON ←THE LEFT.

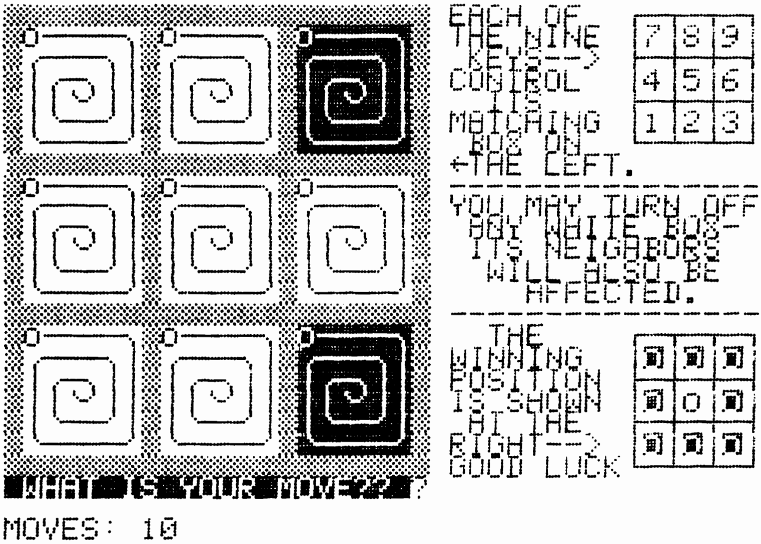
7	8	9
4	5	6
1	2	3

YOU MAY TURN OFF ANY WHITE BOX- ITS NEIGBBORS WILL ALSO BE AFFECTED.

THE WINNING POSITION IS SHOWN AT THE RIGHT--> GOOD LUCK

■	■	■
■	○	■
■	■	■

WHAT IS YOUR MOVE??

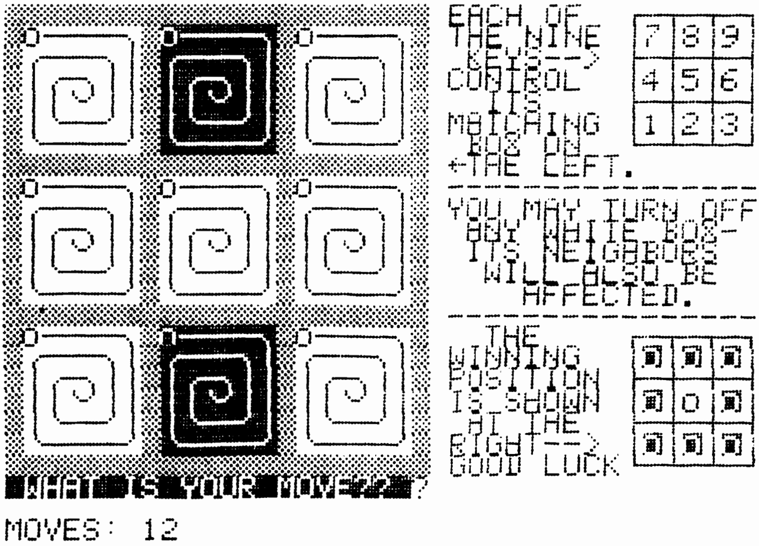


```
EACH OF
THE NINE
 KEYS-->
CONTROL
  ITS
MATCHING
 BOX ON
←THE LEFT.
------------------
YOU MAY TURN OFF
 ANY WHITE BOX-
 ITS NEIGHBORS
  WILL ALSO BE
    AFFECTED.
------------------
   THE
WINNING
POSITION
IS SHOWN
 AT THE
RIGHT-->
GOOD LUCK
```

7	8	9
4	5	6
1	2	3

■	■	■
■	○	■
■	■	■

```
WHAT IS YOUR MOVE??
MOVES: 10
```

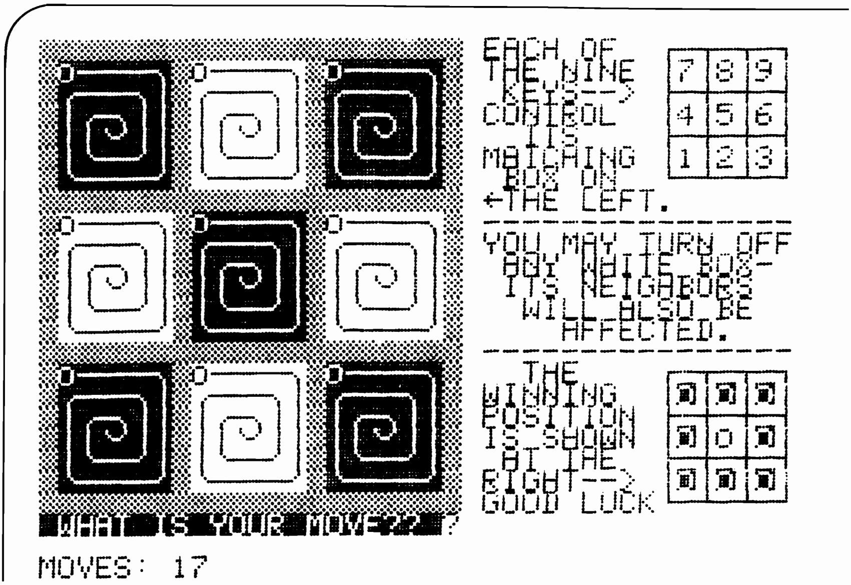


```
EACH OF
THE NINE
 KEYS-->
CONTROL
  ITS
MATCHING
 BOX ON
←THE LEFT.
------------------
YOU MAY TURN OFF
 ANY WHITE BOX-
 ITS NEIGHBORS
  WILL ALSO BE
    AFFECTED.
------------------
   THE
WINNING
POSITION
IS SHOWN
 AT THE
RIGHT-->
GOOD LUCK
```

7	8	9
4	5	6
1	2	3

■	■	■
■	○	■
■	■	■

```
WHAT IS YOUR MOVE??
MOVES: 12
```



EACH OF THE NINE KEYS--> CONTROL ITS MATCHING BOX ON ←THE LEFT.

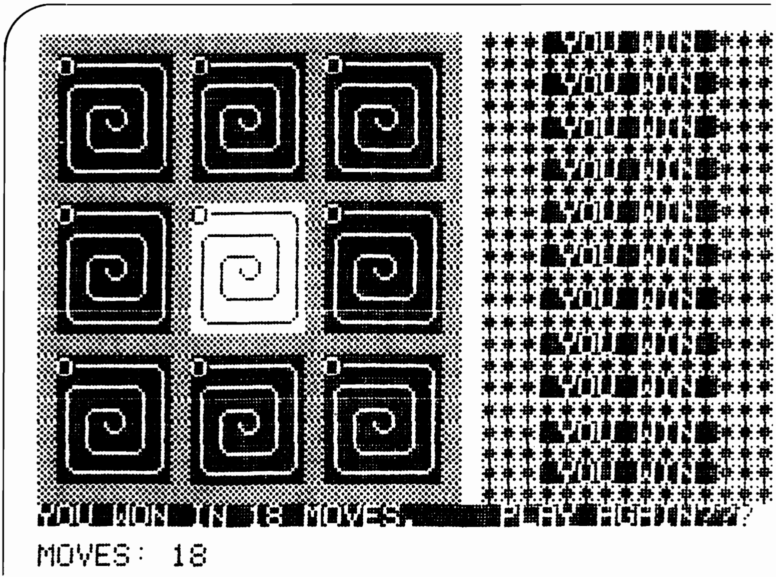
7	8	9
4	5	6
1	2	3

YOU MAY TURN OFF ANY WHITE BOX-- ITS NEIGHBORS WILL ALSO BE AFFECTED.

THE WINNING POSITION IS SHOWN AT THE RIGHT--> GOOD LUCK

WHAT IS YOUR MOVE???

MOVES: 17



YOU WON IN 18 MOVES! PLAY AGAIN?

MOVES: 18

The controlling keys are the numbers on your keypad, also displayed in the upper right-hand corner of your screen. You turn off a box by pressing the number that corresponds to the box's position on the screen. However, every time you turn off a box, this affects its neighbors. You cannot turn *on* a black box by typing in the corresponding number. You can only *turn off white boxes*, thereby affecting their neighbors. Here are the complications of this conundrum:

1. If you turn off a corner box, its three neighbors switch colors.
2. If you turn off the box in the center, the four boxes on each side switch colors.
3. If you turn off the middle box on either side of the puzzle, the two neighboring boxes will also reverse colors.

Your ultimate challenge is to figure out how to win *in only 11 moves* regardless of the starting configuration, which changes randomly with every game. When you have achieved this goal, Len rates you GENIUS. *WARNING*: It may take weeks to become a Genius Brainbuster. Needless to say, this is a C-level game!

Note: *Brainbuster* works on all PET models from the original PET 2001-8 to the most recent CBM 8032 and 8016. Owners of *Business models* may have to substitute for the graphic characters in Line 60. Choose anything to your liking, but *don't* change the cursor movements. Business keyboard players may also replace SHIFT "&" (a gray box on other models) with # or any other graphic character. SHIFT & occurs in Lines 6015, 6040, 6060, and 6090.

Brainbuster is based on "Teaser," *What To Do After You Hit Return*, published by People's Computer Company, P.O. Box E, Menlo Park, CA 94025.

```
Ø REM*** WORKS ON ORIGINAL PET 2ØØ1-8,
      ¬ NEW PET/CBM, BASIC 4.Ø, & CBM ¬
      ¬8Ø32 & 8Ø16
1 REM***BRAIN BUSTER***
2 REM***ORIGINAL PROGRAM
3 REM***AN OLD PUZZLE
4 REM***(C) 198Ø
5 REM***BY LEN LINDSAY
6 REM***Ø1-22-8Ø
7 REM***CHANGE LINE 1Ø4ØØ TO SKIP THE ¬
      ¬TIME DELAY THUSLY:
8 REM***   1Ø4ØØ RETURN
9 REM***USES MAIN SUBROUTINES 1Ø1ØØ,
      ¬ 1Ø4ØØ
1Ø POKE59468,12:REM GRAPHIC MODE
15 XQ=RND(-TI) : XQ=Ø : REM SEED RND
2Ø PRINT"ĥ"; : REM CLEAR SCREEN
4Ø DEF FNR(N)=INT(RND(1)*N+1) : REM RND#
5Ø REM
51 ZZ$="
      ¬" : REM 4Ø DELETE
52 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":
      ¬REM 23 DOWN
56 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→→" : REM 4Ø RIGHT
57 RM$="h"+ZD$+ZZ$ : REM TO REMARK LINE
58 MV$="h↓"+ZD$ : REM TO MOVE LINE
59 REM P$ IS THE PIECE - BLACK AS IS,
      ¬ OR PRECEDE WITH A RVS FOR WHITE ¬
      ¬PIECE
6Ø P$="W@@@@I←←←←←←↓U@@@Il←←←←←←↓lU@Ill←
      ¬←←←←←↓llJKll←←←←←←↓lJ@@Kl←←←←←←↓J@
      ¬@@@Kr̂
61 PC$(1)="h"+LEFT$(ZD$,15)+LEFT$(ZR$,1)
62 PC$(2)="h"+LEFT$(ZD$,15)+LEFT$(ZR$,8)
63 PC$(3)="h"+LEFT$(ZD$,15)+LEFT$(ZR$,
      ¬15)
64 PC$(4)="h"+LEFT$(ZD$,8)+LEFT$(ZR$,1)
65 PC$(5)="h"+LEFT$(ZD$,8)+LEFT$(ZR$,8)
66 PC$(6)="h"+LEFT$(ZD$,8)+LEFT$(ZR$,15)
67 PC$(7)="h"+LEFT$(ZD$,1)+LEFT$(ZR$,1)
68 PC$(8)="h"+LEFT$(ZD$,1)+LEFT$(ZR$,8)
```

```
69 PC$(9)="h̲"+LEFT$(ZD$,1)+LEFT$(ZR$,15)
9Ø PRINT"WOULD YOU LIKE TO SEE THE ¬
      ¬INSTRUCTIONS?"
92 GOSUB1Ø13Ø
94 IFXA$="Y"THENGOSUB5ØØØ:GOTO9Ø
96 IFXA$="N"THEN 1ØØ
98 GOTO92
1ØØ PRINT"ĥ";
1Ø2 MV=Ø : REM INIT MOVE COUNTER
11Ø GOSUB6ØØØ : REM DRAW BOARD
115 GOSUB7ØØØ:REM SET UP RANDOM PIECES
12Ø PRINT RM$;"r̲ WHAT IS YOUR MOVE?? ¬
      ¬r̂?";
13Ø GOSUB 1Ø13Ø : REM GET
14Ø IFXA$="Q"THEN END
15Ø IFXA=ØTHEN13Ø
155 IFPZ(XA)=ØTHENPRINTRM$;"r̲CHOOSE ¬
      ¬ONLY THE WHITE BOXES. YOUR ¬
      ¬MOVE?r̂";:GOTO13Ø
16Ø MV=MV+1 : REM INCREMENT MOVE COUNT
17Ø PRINTMV$;"MOVES:";MV;
18Ø PRINTRM$;"FIRST I'LL TURN OFF ¬
      ¬BOX";XA
19Ø PZ(XA)=Ø: PRINTPC$(XA);P$
195 GOSUB1Ø4ØØ
2ØØ PRINTRM$;"r̲NOW I'LL CHANGE ITS ¬
      ¬NEIGHBORS"
21Ø GOSUB1Ø4ØØ
25Ø ONXAGOSUB31Ø,32Ø,33Ø,34Ø,35Ø,36Ø,
      ¬37Ø,38Ø,39Ø
26Ø WN=Ø
27Ø FORQ=1TO9:WN=WN+PZ(Q):NEXTQ
28Ø IFWN=8ANDPZ(5)=ØTHEN75ØØ:REM ¬
      ¬WINNER****
29Ø IFWN=ØTHEN76ØØ:REM LOSER***
3ØØ GOSUB71ØØ: GOTO12Ø : REM NEXT MOVE
31Ø PZ(2)=1-PZ(2)
311 PZ(4)=1-PZ(4)
312 PZ(5)=1-PZ(5)
319 RETURN
32Ø PZ(1)=1-PZ(1)
321 PZ(3)=1-PZ(3)
```

```
329 RETURN
33Ø PZ(2)=1-PZ(2)
331 PZ(5)=1-PZ(5)
332 PZ(6)=1-PZ(6)
339 RETURN
34Ø PZ(7)=1-PZ(7)
341 PZ(1)=1-PZ(1)
349 RETURN
35Ø PZ(8)=1-PZ(8)
351 PZ(4)=1-PZ(4)
352 PZ(6)=1-PZ(6)
353 PZ(2)=1-PZ(2)
359 RETURN
36Ø PZ(9)=1-PZ(9)
361 PZ(3)=1-PZ(3)
369 RETURN
37Ø PZ(8)=1-PZ(8)
371 PZ(4)=1-PZ(4)
372 PZ(5)=1-PZ(5)
379 RETURN
38Ø PZ(7)=1-PZ(7)
381 PZ(9)=1-PZ(9)
389 RETURN
39Ø PZ(8)=1-PZ(8)
391 PZ(5)=1-PZ(5)
392 PZ(6)=1-PZ(6)
399 RETURN
4999 END
5ØØØ PRINT"ĥ"; : REM INSTRUCTIONS
5Ø1Ø PRINT"THIS PUZZLE SHOULD PROVE TO ¬
       ¬BE A GOOD"
5Ø15 PRINT
5Ø2Ø PRINT"EXERCISE FOR YOUR BRAIN. ¬
       ¬TEST YOUR"
5Ø25 PRINT
5Ø3Ø PRINT"LOGIC AS WELL AS STRATEGIES. ¬
       ¬IT IS NOT"
5Ø35 PRINT
5Ø4Ø PRINT"EASY, BUT CHALLENGES ARE ¬
       ¬ALWAYS THE"
5Ø45 PRINT
5Ø5Ø PRINT"MOST FUN."
5Ø6Ø PRINT
```

```
5090 GOSUB10100
5100 PRINT"ĥ";
5110 PRINT"YOU BEGIN WITH THE NINE ¬
      ¬BOXES RANDOMLY"
5115 PRINT
5120 PRINT"SET TO WHITE OR BLACK. EACH ¬
      ¬TURN YOU"
5125 PRINT
5130 PRINT"MAY TURN OFF ANY OF THE ¬
      ¬WHITE BOXES"
5135 PRINT
5140 PRINT"(CHANGE IT TO BLACK). ¬
      ¬HOWEVER, THIS"
5145 PRINT
5150 PRINT"WILL AFFECT THE STATUS OF ¬
      ¬ITS NEIGHBORS"
5155 PRINT
5160 PRINT"TOO. NEXT WILL BE SOME ¬
      ¬EXAMPLES."
5165 PRINT
5190 GOSUB10100
5200 GOSUB5900
5210 PRINT"IF YOU TURN OFF A CORNER,
      ¬ THE OTHER"
5220 PRINT"THREE BOXES IN THAT CORNER ¬
      ¬SECTION WILL"
5230 PRINT"BE CHANGED (WHITE BECOME ¬
      ¬BLACK, AND"
5240 PRINT"BLACK BECOME WHITE)."
5245 PRINT
5250 PRINT"FOR EXAMPLE, LETS TURN OFF ¬
      ¬r9r̂. THE"
5260 PRINT"RESULT WOULD BE THIS:"
5270 PRINT
5271 PRINT"Ø@2@2@."
5272 PRINT"]7]r8r̂]9]"
5273 PRINT"+@[@[@3"
5274 PRINT"]r4r̂]5]r6r̂]"
5275 PRINT"+@[@[@3"
5276 PRINT"]1]r2r̂]3]"
5277 PRINT"-@1@1@="
5290 GOSUB10100
5300 GOSUB5900
```

```
5310 PRINT"IF YOU TURN OFF THE MIDDLE ¬
      ¬BOX ON ONE"
5320 PRINT"OF THE FOUR SIDES, THE TWO ¬
      ¬CORNER BOXES"
5330 PRINT"THAT IT TOUCHES WILL BE ¬
      ¬CHANGED. FOR"
5340 PRINT"EXAMPLE, LETS TURN OFF r4r̂. ¬
      ¬THE RESULT"
5350 PRINT"WOULD BE THIS:"
5360 PRINT
5371 PRINT"Ø@2@2@."
5372 PRINT"]r7r̂]8]r9r̂]"
5373 PRINT"+@[@[@3"
5374 PRINT"]4]r5r̂]6]"
5375 PRINT"+@[@[@3"
5376 PRINT"]r1r̂]r2r̂]3]"
5377 PRINT"-@1@1@="
5390 GOSUB1Ø1ØØ
5400 GOSUB59ØØ
5410 PRINT"IF YOU TURN OFF THE BOX IN ¬
      ¬THE VERY"
5420 PRINT"CENTER (THE 5) ITS FOUR ¬
      ¬DIRECT"
5430 PRINT"NEIGHBORS WILL CHANGE (NOT ¬
      ¬THE"
5440 PRINT"DIAGONALS). FOR EXAMPLE IF ¬
      ¬WE TURN OFF"
5450 PRINT"THE r5r̂ THE RESULT IS:"
5460 PRINT
5471 PRINT"Ø@2@2@."
5472 PRINT"]7]r8r̂]r9r̂]"
5473 PRINT"+@[@[@3"
5474 PRINT"]4]5]r6r̂]"
5475 PRINT"+@[@[@3"
5476 PRINT"]1]2]3]"
5477 PRINT"-@1@1@="
5490 GOSUB1Ø1ØØ
5500 PRINT"ĥ";
5510 PRINT"OK, THAT IS ALL THERE IS TO ¬
      ¬IT!"
5520 PRINT
5530 PRINT"PERHAPS YOU WOULD LIKE TO ¬
      ¬RUN THROUGH"
```

```
5535 PRINT
5540 PRINT"THESE INSTRUCTIONS AGAIN. ¬
      ¬THUS I WILL"
5545 PRINT
5550 PRINT"GIVE YOU THAT OPTION."
5555 PRINT:PRINT
5560 PRINT
5590 RETURN
5900 PRINT"ĥ";
5910 PRINT"Ø@2@2@.  HERE IS A POSSIBLE"
5920 PRINT"]7]8]r9r̂]  RANDOM POSITION"
5930 PRINT"+@[@[@3"
5940 PRINT"]r4r̂]r5r̂]6]"
5950 PRINT"+@[@[@3"
5960 PRINT"]1]r2r̂]3]"
5970 PRINT"-@1@1@="
5980 PRINT
5990 RETURN
6000 PRINT"h"; : REM PRINT BOARD
6010 FORX=1TO3
6015 :FORY=1TO22:PRINT"&";:NEXTY:PRINT
6020 :FORY=1TO6
6030 ::FORZ=1TO3
6040 :::PRINT"&→→→→→→";
6050 ::NEXT
6060 ::PRINT"&"
6070 :NEXT
6080 NEXT
6090 FORY=1TO22:PRINT"&";:NEXTY:PRINT
6100 PRINT"h";
6110 PRINTTAB(23);"EACH OF  Ø@2@2@."
6120 PRINTTAB(23);"THE NINE ]7]8]9]"
6130 PRINTTAB(23);" KEYS--> +@[@[@3"
6140 PRINTTAB(23);"CONTROL  ]4]5]6]"
6150 PRINTTAB(23);"  ITS    +@[@[@3"
6160 PRINTTAB(23);"MATCHING ]1]2]3]"
6170 PRINTTAB(23);" BOX ON  -@1@1@="
6180 PRINTTAB(23);"^THE LEFT.
6190 PRINTTAB(23);"----------------"
6200 PRINTTAB(23);"YOU MAY TURN OFF"
6210 PRINTTAB(23);" ANY WHITE BOX-  "
6220 PRINTTAB(23);" ITS NEIGHBORS   "
6230 PRINTTAB(23);"  WILL ALSO BE   "
```

```
6240 PRINTTAB(23);"    AFFECTED.   "
6250 PRINTTAB(23);"---------------"
6300 PRINTTAB(23);"  THE    Ø@2@2@."
6310 PRINTTAB(23);"WINNING  ]rWr̂]rWr̂]rWr̂
      ¬l"
6320 PRINTTAB(23);"POSITION +@[@[@3"
6330 PRINTTAB(23);"IS SHOWN ]rWr̂]W]rWr̂l"
6340 PRINTTAB(23);" AT THE  +@[@[@3"
6350 PRINTTAB(23);"RIGHT--> ]rWr̂]rWr̂]rWr̂
      ¬l"
6360 PRINTTAB(23);"GOOD LUCK-@1@1@="
6400 REM
6999 RETURN
7000 FORX=9TO1STEP-1
7010 :PRINTPC$(X);
7015 :PZ(X)=FNR(2)-1 : REM PUZZLE ARRAY
7020 :IFPZ(X) THENPRINT"r";
7030 :PRINTP$
7040 NEXTX
7099 RETURN
7100 FORQ=9TO1STEP-1
7110 :PRINTPC$(Q);
7120 :IFPZ(Q)THENPRINT"r";
7130 :PRINTP$
7140 NEXT Q
7199 RETURN
7500 GOSUB7100:REM PRINT BOARD
7525 GOSUB7100:REM PRINT BOARD
7527 PRINT"h";
7530 FORW=1TO11
7540 :PRINT TAB(23);"***r YOU WIN r̂*** "
7550 :PRINT TAB(23);"*************** "
7560 NEXTW
7570 PRINT"rYOU WON IN";MV;"< MOVES.     ¬
      ¬PLAY AGAIN??r̂?";
7580 GOSUB10130:REM GET
7590 IFXA$="Y"THEN100
7595 IFXA$="N"THENPRINT"↑↑↑":END
7599 GOTO7580
7600 GOSUB7100:PRINTRM$;"YOU CAN NOT ¬
      ¬WIN NOW!-rPLAY AGAIN?? r̂?"
7605 GOSUB7100:PRINTRM$;"YOU CAN NOT ¬
      ¬WIN NOW!-rPLAY AGAIN?? r̂?"
```

```
 761Ø GOTO758Ø
 8ØØØ REM
 8Ø99 RETURN
 1Ø1ØØ IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
       ¬CONTINUE r̂" : REM GET 1 CHARACTER
 1Ø12Ø IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
 1Ø13Ø GETXA$:IFXA$>""THEN1Ø13Ø:REM ¬
       ¬CLEAR BUFFER
 1Ø14Ø GETXA$:IFXA$=""THEN1Ø14Ø
 1Ø15Ø XA=VAL(XA$)
 1Ø199 XX$="":RETURN
 1Ø4ØØ IFXP=ØTHENXP=3 :REM PAUSE
 1Ø42Ø XJ=TI+6Ø*XP
 1Ø43Ø IFTI<XJTHEN1Ø43Ø
 1Ø499 XJ=Ø:XP=Ø:RETURN
READY.
```

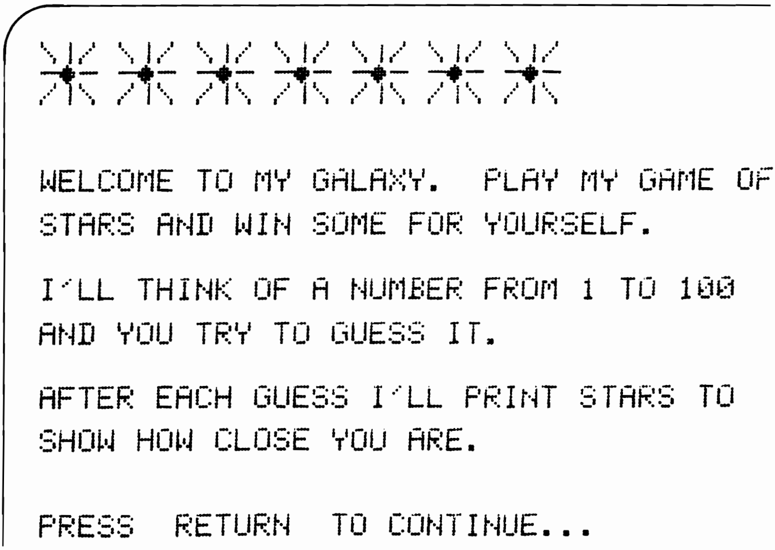
Chapter 3

Games of Deductive Reasoning

Stars

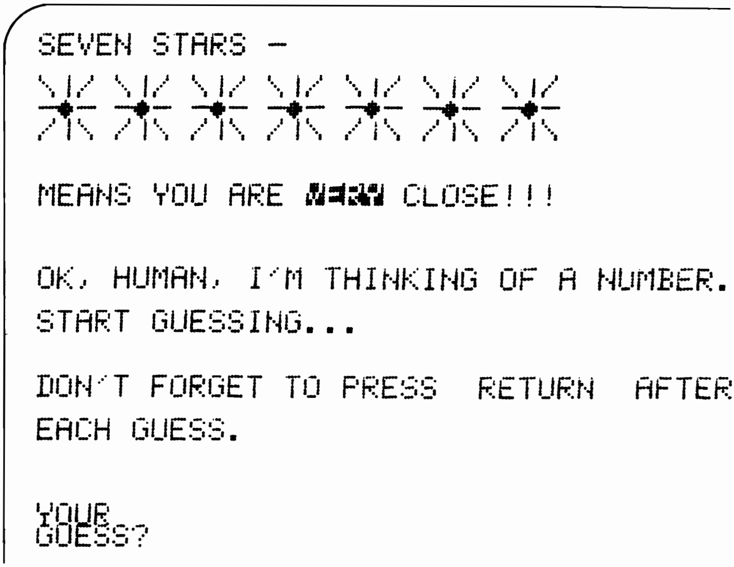
by Mac Oglesby

This excursion into the Galaxy is an excellent, simple introduction to games of deductive reasoning. Using the clues available, can you discover the correct solution?
In *Stars*, your objective is to guess a number from 1 to 100. Type your guess and press RETURN. Your PET will let you know if you're hot, warm, or cold.



```
WELCOME TO MY GALAXY.  PLAY MY GAME OF
STARS AND WIN SOME FOR YOURSELF.

I'LL THINK OF A NUMBER FROM 1 TO 100
AND YOU TRY TO GUESS IT.

AFTER EACH GUESS I'LL PRINT STARS TO
SHOW HOW CLOSE YOU ARE.


PRESS  RETURN  TO CONTINUE...
```

If your guess is *very close* to the secret number, your PET will display seven (7) stars on your screen:

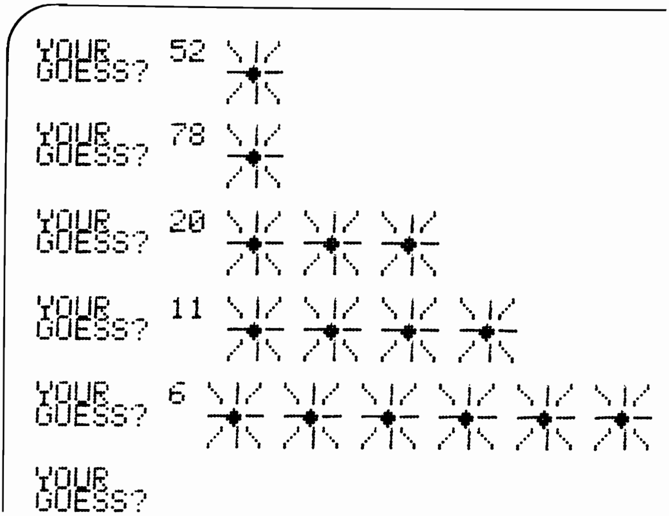


```
SEVEN STARS -
\|/ \|/ \|/ \|/ \|/ \|/ \|/
-*- -*- -*- -*- -*- -*- -*-
/|\ /|\ /|\ /|\ /|\ /|\ /|\

MEANS YOU ARE VERY CLOSE!!!

OK, HUMAN, I'M THINKING OF A NUMBER.
START GUESSING...

DON'T FORGET TO PRESS  RETURN  AFTER
EACH GUESS.

YOUR
GUESS?
```

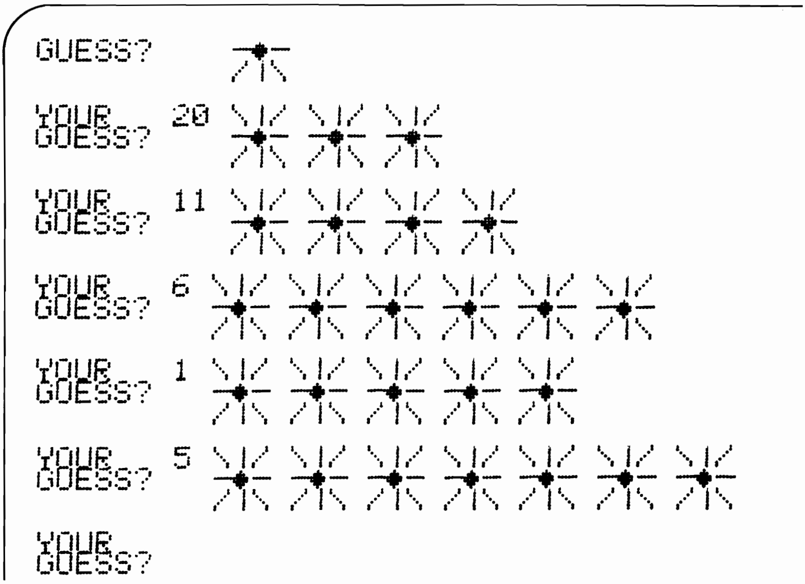
If your guess isn't even in the right galaxy, your star-gazing PET will only display one or two stars:

This means you're way off base!

You can deduce the correct answer by paying attention to the number of stars your PET gives you in relation to your guesses.

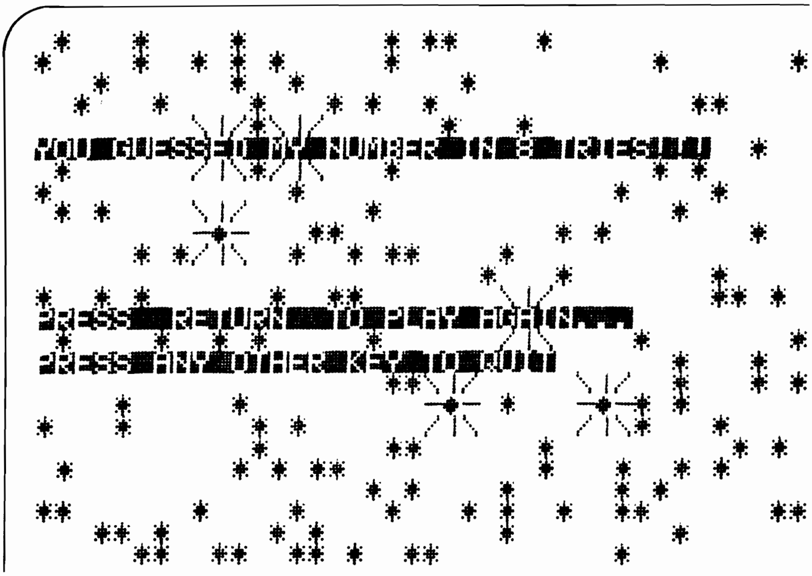


```
YOUR      52 \|/
GUESS?       -*-
             /|\

YOUR      78 \|/
GUESS?       -*-
             /|\

YOUR      20 \|/ \|/ \|/
GUESS?       -*- -*- -*-
             /|\ /|\ /|\

YOUR      11 \|/ \|/ \|/ \|/
GUESS?       -*- -*- -*- -*-
             /|\ /|\ /|\ /|\

YOUR      6 \|/ \|/ \|/ \|/ \|/ \|/
GUESS?      -*- -*- -*- -*- -*- -*-
            /|\ /|\ /|\ /|\ /|\ /|\

YOUR
GUESS?
```



```
GUESS?
YOUR GUESS? 20
YOUR GUESS? 11
YOUR GUESS? 6
YOUR GUESS? 1
YOUR GUESS? 5
YOUR GUESS?
```

The real challenge is to see how quickly you can arrive at the solution with the fewest possible number of guesses. Each time you win this celestial guessing game, your computer rewards you with:



Keep your eye on the stars!

Level A: Perfect for beginning gamesters and fun for everyone.

```
100 REM  NAME:  STARS
110 REM
120 REM  (C)  MAC OGLESBY   9/30/79
130 REM
140 REM  A NUMBER GUESSING GAME BASED
150 REM  ON THE LISTING PUBLISHED IN
160 REM  "PEOPLE'S COMPUTERS" JAN 78
170 REM
1000 REM *** WELCOME
1010 POKE 59468,12: REM GRAPHICS MODE
1020 X=RND(-TI): X=0: REM RND SEED
1100 GOSUB 9000
1110 FOR J=1 TO 800: NEXT J
1120 PRINT "ĥ";
1130 FOR J=1 TO 7
1140 : PRINT ST$;
1150 : PRINT " ↑↑";
1160 NEXT J
1165 PRINT
1170 PRINT "↓↓↓↓↓WELCOME TO MY GALAXY.  ¬
      ¬PLAY MY GAME OF"
1180 PRINT: PRINT "STARS AND WIN SOME ¬
      ¬FOR YOURSELF."
1190 PRINT: PRINT: PRINT "I'LL THINK OF ¬
      ¬A NUMBER FROM 1 TO 100"
1200 PRINT: PRINT "AND YOU TRY TO GUESS ¬
      ¬IT."
1210 PRINT: PRINT: PRINT "AFTER EACH ¬
      ¬GUESS I'LL PRINT STARS TO"
1220 PRINT: PRINT "SHOW HOW CLOSE YOU ¬
      ¬ARE."
1225 PRINT "↓↓↓PRESS  RETURN  TO ¬
      ¬CONTINUE..."
1230 GOSUB 5000
1245 PRINT "ĥSEVEN STARS @̲↓"
1250 FOR J=1 TO 7
1255 : PRINT ST$;" ↑↑";
1270 NEXT J
1275 PRINT
1280 PRINT "↓↓↓↓MEANS YOU ARE r̲VERYr̂ ¬
      ¬CLOSE!!!"
1300 PRINT "↓↓↓OK, HUMAN, I'M THINKING ¬
      ¬OF A NUMBER."
```

```
131Ø PRINT "↓START GUESSING..."
134Ø PRINT "↓↓DON'T FORGET TO PRESS  ¬
      ¬RETURN  AFTER"
135Ø PRINT "↓EACH GUESS."
136Ø PRINT
15ØØ X=1+INT(1ØØ*RND(1)): REM PICK ¬
      ¬NUMBER
16ØØ N=1: REM RESET GUESS COUNTER
2ØØØ REM ** ACCEPT GUESSES
21ØØ PRINT "↓↓YOUR"
212Ø PRINT "GUESS? ↑";
22ØØ B$=""
22Ø5 GET A$: IF A$<>"" THEN 22Ø5
221Ø GET A$: IF A$="" THEN 221Ø
2215 IF ASC(A$)=13 THEN 224Ø
222Ø IF LEN(B$)>2 THEN 23ØØ
2225 IF ASC(A$)>47 AND ASC(A$)<58 THEN ¬
      ¬PRINT A$;: B$=B$+A$
223Ø GOTO 22Ø5
224Ø G=VAL(B$)
225Ø IF G>Ø AND G<1Ø1 AND G=INT(G) THEN ¬
      ¬25ØØ
23ØØ PRINT: PRINT: PRINT "PLEASE TYPE A ¬
      ¬WHOLE NUMBER FROM 1 TO 1ØØ":
      ¬ GOTO 2ØØØ
25ØØ IF G=X THEN 4ØØØ
25Ø5 GOTO 3ØØØ
3ØØØ REM *** SHOW CLUES
31ØØ D=ABS(G-X)
311Ø PRINT " ";
32ØØ FOR J=LOG(D)/LOG(2) TO 6
321Ø : PRINT ST$;" ↑↑";
322Ø NEXT J
3225 N=N+1
323Ø PRINT: PRINT: GOTO 2ØØØ
4ØØØ REM *** PLAYER GUESSED IT
41ØØ GOSUB 9ØØØ
411Ø PRINT "h̲↓↓↓↓↓r̲YOU GUESSED MY ¬
      ¬NUMBER IN";N;"← ";
412Ø IF N=1 THEN PRINT "r̲TRY!!!":
      ¬ GOTO 42ØØ
413Ø PRINT "r̲TRIES!!!"
414Ø PRINT "↓↓↓↓↓↓";
```

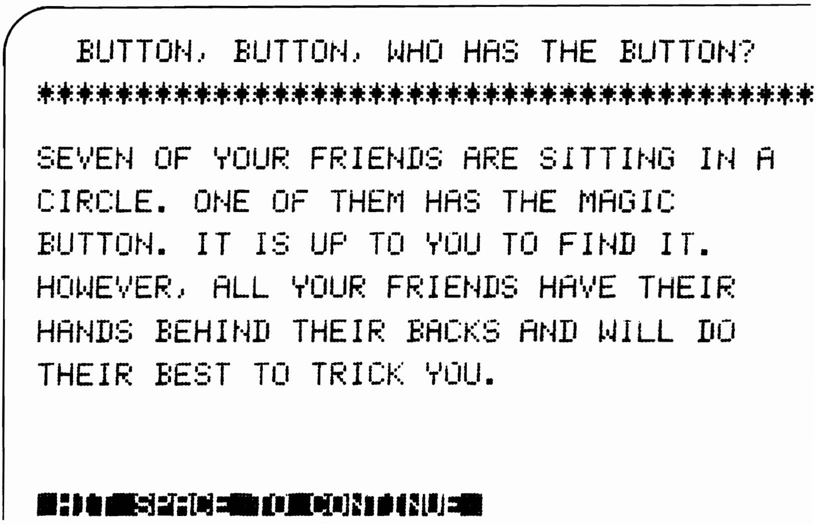
```
 42ØØ PRINT "↓rPRESS  RETURN  TO PLAY ¬
       ¬AGAIN..."
 421Ø PRINT "↓rPRESS ANY OTHER KEY TO ¬
       ¬QUIT"
 422Ø GOSUB 5ØØØ: PRINT "ĥ";: IF ¬
       ¬ASC(A$)=13 THEN 13ØØ
 423Ø PRINT "↓THANKS FOR PLAYING ¬
       ¬rSTARSr̂.↓"
 424Ø PRINT "BYE FOR NOW...↓"
 425Ø END
 5ØØØ REM *** GET A RETURN
 51ØØ GET A$: IF A$<>"" THEN 51ØØ
 511Ø GET A$: IF A$="" THEN 511Ø
 52ØØ RETURN
 9ØØØ REM *** STARS, AND MORE STARS
 9Ø1Ø PRINT "ĥ";
 9Ø2Ø S=1ØØ+INT(1ØØ*RND(1))
 9Ø3Ø FOR J=1 TO S
 9Ø4Ø : Y=1+INT(1ØØØ*RND(1)): POKE ¬
       ¬32768+Y,42
 9Ø5Ø NEXT J
 911Ø ST$="\1/↓←←←@Z@↓←←←/1\"
 912Ø R$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
 913Ø C$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
       ¬→→→→→"
 92ØØ FOR J=1 TO 9
 921Ø : R=(1+INT(5*RND(1)))*4
 922Ø : C=(1+INT(9*RND(1)))*4
 923Ø : PRINT "h";LEFT$(R$,R);LEFT$(C$,
       ¬C);
 924Ø : PRINT ST$
 93ØØ NEXT J
 94ØØ RETURN
READY.
```

Button, Button

by Len Lindsay

Len's inspiration for this game is "Button, Button, Who Has The Button?" Kids have been playing this game for hundreds of years all around the world, so Len decided to devise a version for the PET computer. *Button* works on all PETs, from the original PET 2001-8 to the latest CBM 8032. (Lines 10, 11, and 52 are for the latest 80-column CBM 8032 and 8016 computers, but your program will work no matter which PET you're playing with).

The object of this game is to guess a *moving target*. In *Stars*, the secret number just stayed put until you guessed it. *Button* increases the challenge. Seven players are seated in a circle. They're numbered one through seven:

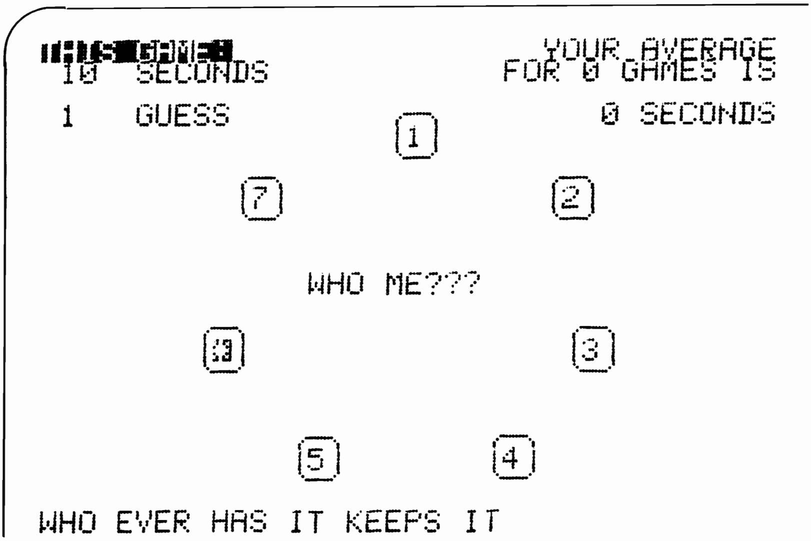


```
  BUTTON, BUTTON, WHO HAS THE BUTTON?
****************************************

SEVEN OF YOUR FRIENDS ARE SITTING IN A
CIRCLE. ONE OF THEM HAS THE MAGIC
BUTTON. IT IS UP TO YOU TO FIND IT.
HOWEVER, ALL YOUR FRIENDS HAVE THEIR
HANDS BEHIND THEIR BACKS AND WILL DO
THEIR BEST TO TRICK YOU.



 HIT SPACE TO CONTINUE
```

Only *one* of these players has the magic button, and you must guess which one. However, to complicate matters—every time you guess incorrectly, the player with the magic button may keep the button OR pass it to one of the players next to him.

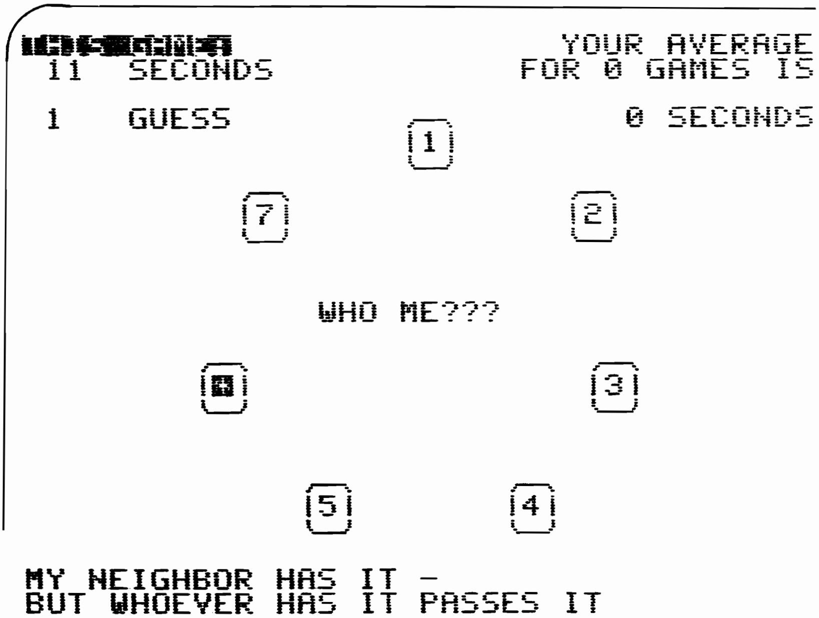
You won't be able to see who has the magic button, or to whom it gets passed, since all the players have their hands behind their backs. Your PET will give you clues, however. For example, you guess that Player Number 6 has the button. Hit the 6 key.

Oops! Number 6 player doesn't have the button. Your PET obligingly tells you so, and also informs you whether the keeper of the button has kept it or passed it:



```
THIS GAME                              YOUR AVERAGE
 10  SECONDS                        FOR 0 GAMES IS
 1   GUESS                              0 SECONDS
                      [1]

               [7]              [2]

                   WHO ME???

             [6]                   [3]

                 [5]        [4]

WHO EVER HAS IT KEEPS IT
```

OR



```
                                          YOUR AVERAGE
 11   SECONDS                          FOR 0 GAMES IS

 1    GUESS                                 0 SECONDS
                      [1]

              [7]              [2]

                   WHO ME???

            [■]                   [3]

                [5]         [4]

MY NEIGHBOR HAS IT -
BUT WHOEVER HAS IT PASSES IT
```

To make this game even more suspenseful, the seconds are ticking away on your screen; and your PET displays the number of guesses you've made, the time to guess the correct solution, and your average for all the games you play.

You can develop a strategy to find the elusive magic button and cut down your time and number of guesses. You don't need X-ray eyes to be a successful detective.

Level A: Still a fine beginner's game, with more challenge.

```
0 REM*** WORKS ON ORIGINAL PET 2001-8,
      ¬ NEW PET/CBM, & BASIC 4.0
1 REM***BUTTON, BUTTON, WHO HAS THE ¬
      ¬BUTTON***
2 REM***ORIGINAL PROGRAM BY LEN ¬
      ¬LINDSAY***
3 REM***(C) 1980
4 REM***01-16-80
5 REM***INCLUDES HELP OPTION AND TWO ¬
      ¬SPEEDS FOR PRINTING INSTRUCTIONS
6 REM***YOUR AVERAGES ARE KEPT - AND ¬
      ¬CORRECT ENGLISH IS USED
7 REM***IE...1 GAME (NOT 1 GAMES)
8 REM***THE BOX YOU GUESS LIGHTS UP - ¬
      ¬MESSAGES ARE IN TWO SEPERATE ¬
      ¬PLACES.
9 REM***USES MAIN SUBROUTINES 10100,
      ¬ 10500
10 POKE59468,12 : REM GRAPHIC MODE
15 XQ=RND(-TI) : XQ=0 : REM SEED RND
20 PRINT"ĥ"; : REM CLEAR SCREEN
30 DIM B$(7) : REM CURSOR MOVEMENT TO ¬
      ¬BOX#
40 DEF FNR(N)=INT(RND(1)*N+1) : REM RND#
50 REM
51 ZZ$="
      ¬" : REM 40 DELETE
54 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→" ¬
      ¬: REM 30 RIGHT
56 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓" :
      ¬ REM 25 DOWN
58 MS$="h̲"+LEFT$(ZD$,12)+LEFT$(ZR$,
      ¬13)+ZZ$+ZZ$ : REM START OF MESSAGE
59 RM$="h̲"+LEFT$(ZD$,24)+ZZ$+ZZ$ :
      ¬ REM START OF REMARK
61 B$(1)="h̲"+LEFT$(ZD$,4)+LEFT$(ZR$,
      ¬19)+"1"
62 B$(2)="h̲"+LEFT$(ZD$,7)+LEFT$(ZR$,
      ¬27)+"2"
63 B$(3)="h̲"+LEFT$(ZD$,14)+LEFT$(ZR$,
      ¬28)+"3"
64 B$(4)="h̲"+LEFT$(ZD$,19)+LEFT$(ZR$,
      ¬24)+"4"
```

```
65 B$(5)="h̲"+LEFT$(ZD$,19)+LEFT$(ZR$,
     ¬14)+"5"
66 B$(6)="h̲"+LEFT$(ZD$,14)+LEFT$(ZR$,
     ¬9)+"6"
67 B$(7)="h̲"+LEFT$(ZD$,7)+LEFT$(ZR$,
     ¬11)+"7"
90 PRINT"DO YOU NEED INSTRUCTIONS?"
92 GOSUB10130
95 IFXA$<>"N"ANDXA$<>"Y"THEN92
96 IFXA$="Y" THEN GOSUB 5000 : REM ¬
     ¬INSTRUCTIONS
100 BN=FNR(7) : REM CHOOSE STARTING ¬
     ¬BUTTON LOCATION
101 G=0 : GS=0 : SP=1 : REM INITIALIZE
110 GOSUB 6000 : REM DRAW SCREEN BOARD
120 TI$="000001" : REM INITIALIZE TIME
200 GET A$ : REM GET CHOICE
210 IF A$="" THEN 400 : REM NO KEY HIT
215 IF A$="H" THEN TH$=TI$:GOSUB5000:
     ¬TI$=TH$:GOSUB6000:GOTO200 :
     ¬ REM REPEAT
220 A=VAL(A$)
230 IF A=0 THEN 7100 : REM PRINT ERROR
240 IF A>7 THEN 7100 : REM PRINT ERROR
250 GS=GS+1 : PRINT"h̲↓↓↓";GS : REM ¬
     ¬UPDATE GUESS COUNT
255 PRINT B$(G) : REM REDO LAST BOX
257 G=A : REM CURRENT GUESS
260 PRINT B$(G)+"←r̲*" : REM LIGHT UP ¬
     ¬BOX CHOSEN
270 IFG=BN THEN 7200
280 PRINT MS$;"↓→WHO ME???"
290 GOSUB7300 : REM CHECK IF NEIGHBOR ¬
     ¬HAS IT
400 GOSUB 7000 : REM UPDATE SECONDS
410 GOTO200 : REM GET NEXT CHOICE
4999 END
5000 PRINT"ĥ↓↓"; : REM INSTRUCTIONS
5020 XX$="  BUTTON, BUTTON, WHO HAS THE ¬
     ¬BUTTON?":GOSUB10500
5025 PRINT
5030 XX$="******************************
     ¬**********" : GOSUB 10500
```

```
5Ø35 PRINT
5Ø4Ø XX$="SEVEN OF YOUR FRIENDS ARE ¬
      ¬SITTING IN A":GOSUB1Ø5ØØ
5Ø45 PRINT
5Ø5Ø XX$="CIRCLE. ONE OF THEM HAS THE ¬
      ¬MAGIC":GOSUB1Ø5ØØ
5Ø55 PRINT
5Ø6Ø XX$="BUTTON. IT IS UP TO YOU TO ¬
      ¬FIND IT.":GOSUB1Ø5ØØ
5Ø65 PRINT
5Ø7Ø XX$="HOWEVER, ALL YOUR FRIENDS ¬
      ¬HAVE THEIR":GOSUB1Ø5ØØ
5Ø75 PRINT
5Ø8Ø XX$="HANDS BEHIND THEIR BACKS AND ¬
      ¬WILL DO":GOSUB1Ø5ØØ
5Ø85 PRINT
5Ø9Ø XX$="THEIR BEST TO TRICK YOU.":
      ¬GOSUB1Ø5ØØ
5Ø95 PRINTRM$:GOSUB1Ø1ØØ : REM HIT ¬
      ¬SPACE TO CONTINUE
51ØØ PRINT"ĥ"
511Ø XX$="YOU MUST GUESS WHO HAS THE ¬
      ¬MAGIC BUTTON.":GOSUB1Ø5ØØ
5115 PRINT
512Ø XX$="IF YOU ARE RIGHT, SUCCESS IS ¬
      ¬YOURS, BUT":GOSUB1Ø5ØØ
5125 PRINT
513Ø XX$="IF NOT, YOU ARE ALLOWED ¬
      ¬ANOTHER GUESS.":GOSUB1Ø5ØØ
5135 PRINT:PRINT
514Ø XX$="r̲HOWEVER ---":GOSUB1Ø5ØØ
5145 PRINT
515Ø XX$="AFTER EACH OF YOUR r̲INCORRECTr̂
      ¬ GUESSES":GOSUB1Ø5ØØ
5155 PRINT
516Ø XX$="WHOEVER DOES HAVE THE MAGIC ¬
      ¬BUTTON":GOSUB1Ø5ØØ
5165 PRINT
517Ø XX$="MAY PASS IT TO A NEIGHBOR IF ¬
      ¬THEY WISH!!":GOSUB1Ø5ØØ
5175 PRINT
518Ø XX$="BUT, OF COURSE, THEY MAY KEEP ¬
      ¬IT TOO!!":GOSUB1Ø5ØØ
```

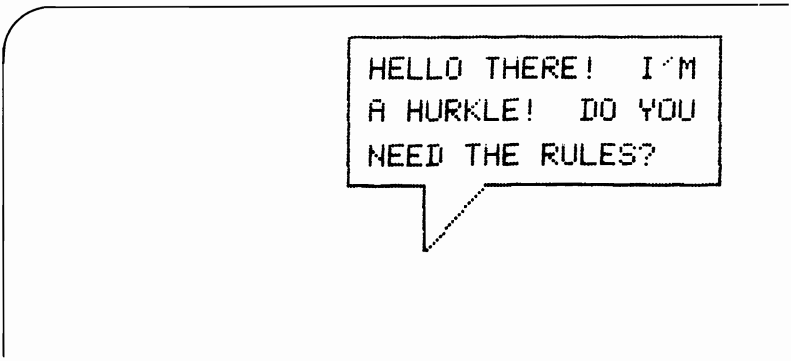
```
5185 PRINT
5190 XX$="TO REPEAT THESE INSTRUCTIONS ¬
      ¬ANSWER r̲Hr̂ELP":GOSUB10500
5195 PRINTRM$:GOSUB10100
5999 RETURN
6000 PRINT"ĥ"; : REM DRAW SCREEN BOARD
6010 FOR X=1 TO 7
6020 :PRINT B$(X);
6030 :PRINT "←←1̲←↑U̲@̲I̲←↓1̲←←←↓J̲@̲K̲"
6040 NEXT X
6100 PRINT"h̲r̲THIS GAME:"
6105 PRINT"→→→→→SECONDS"
6200 PRINTMS$;" WHO HAS THE"
6210 PRINT TAB(16);"BUTTON?"
6300 PRINT"h̲";TAB(26);"YOUR AVERAGE
6310 PRINTTAB(24);"FOR";NG;"GAME";
6320 IF NG<>1 THEN PRINT"S";
6330 PRINT" IS"
6340 PRINT"↓";TAB(28);TS;"SECOND";
6350 IFTS<>1 THEN PRINT"S";
6360 PRINT : REM CARRIAGE RETURN
6370 PRINT TAB(28);TG;"GUESS";
6380 IFTG<>1 THEN PRINT"ES";
6999 RETURN
7000 PRINT"h̲↓"; : REM PRINT SECONDS
7010 TJ=INT(TI/60)
7020 PRINTTJ
7099 RETURN
7100 PRINTRM$;"PLEASE ENTER THE NUMBER ¬
      ¬(1-7) OF THE"
7110 PRINT"PLAYER YOU THINK HAS THE ¬
      ¬BUTTON."
7199 GOTO 200 : REM GET NEXT CHOICE
7200 PRINT MS$;"r̲YOU ARE RIGHT"
7210 PRINTRM$;"IT TOOK YOU";TJ;"SECOND";
      ¬ : IF TJ>1 THEN PRINT"S";
7215 PRINT" AND"
7220 PRINTGS;"GUESS"; : IF GS>1 THEN ¬
      ¬PRINT "ES";
7225 PRINT". DO YOU WANT TO TRY AGAIN?";
7230 GOSUB 10130
7240 IF XA$="Y" THEN 7270
```

```
 7250 IF XA$="N" THEN PRINT RM$; : END
 7260 GOTO7230 : REM GET REPLY AGAIN
 7270 NG=NG+1:QS=QS+TJ:QG=QG+GS :
       ¬ REM ADD TO TOTALS
 7280 TS=INT(QS/NG) : TG=INT(QG/NG)
 7290 GOTO 100 : REM NEW GAME
 7300 IF G-1=BN OR G+1=BN THEN 7400 :
       ¬ REM NEIGHBOR HAS IT
 7310 IF G=7 AND BN=1 THEN 7400
 7320 IF G=1 AND BN=7 THEN 7400
 7330 GOSUB7500 : REM NEIGHBOR DOESN'T ¬
       ¬HAVE IT
 7399 RETURN
 7400 PRINT RM$;"MY NEIGHBOR HAS IT -
 7410 PRINT "BUT WHOEVER HAS IT PASSES ¬
       ¬IT"
 7420 BN=BN+SGN(RND(1)-.5) : REM PASS IT
 7430 IF BN=0 THEN BN=7
 7440 IF BN=8 THEN BN=1
 7499 RETURN
 7500 PRINTRM$;"WHO EVER HAS IT KEEPS IT"
 7599 RETURN
 10100 IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
       ¬CONTINUE r̂" : REM GET 1 CHARACTER
 10120 IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
 10130 GETXA$:IFXA$>""THEN10130:REM ¬
       ¬CLEAR BUFFER
 10140 GETXA$:IFXA$=""THEN10140
 10150 XA=VAL(XA$)
 10199 XX$="":RETURN
 10500 XL=LEN(XX$) : IF XL=0 THEN 10599 :
       ¬ REM ERROR - RETURN - SLOW PRINTER
 10520 FOR XX=1 TO XL
 10530 :PRINT MID$(XX$,XX,1);
 10540 :XT=TI : REM SET TIMER
 10550 :IF XT+ 5-SP*5>TI THEN 10550 :
       ¬ REM 20 CAN BE VARIED FOR DIF ¬
       ¬LENGTH PAUSE
 10560 NEXT XX
 10570 PRINT
 10599 XL=0:XT=0:XX=0:XX$="":RETURN
READY.
```

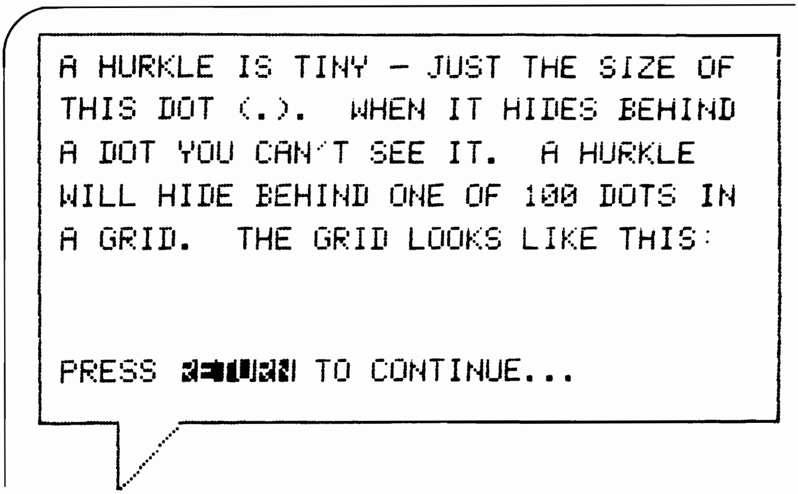
Hurkle

by Mac Oglesby

The Hurkle is a happy beast—and he'll be even happier when you find him! This lovable little critter loves to play hide-and-seek with you. He can find you much easier than you can find him. You can try hiding behind your PET and hope your feet don't stick out too much, but the HURKLE is so tiny, he can hide behind the (.) on your screen:

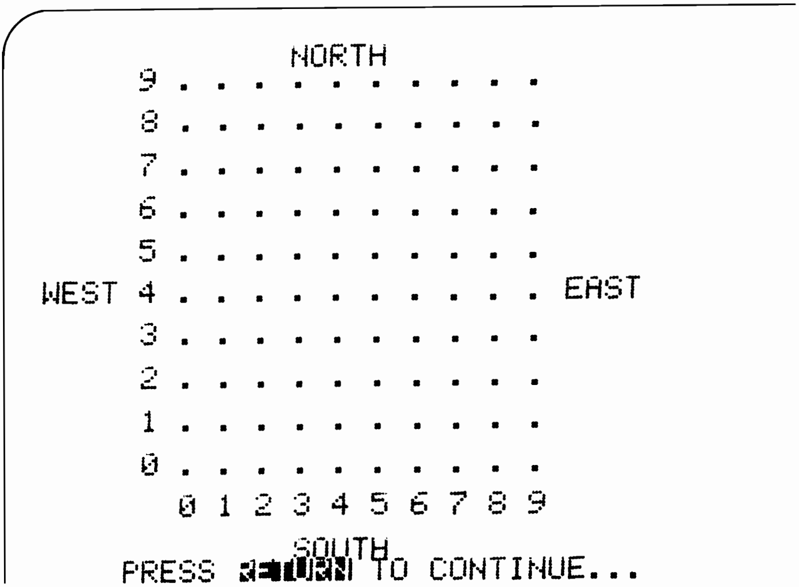


```
HELLO THERE!  I'M
A HURKLE!  DO YOU
NEED THE RULES?
```

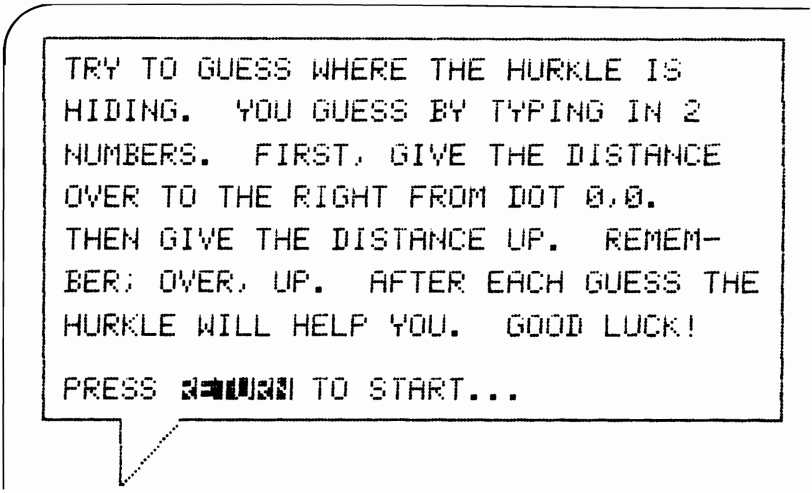


```
A HURKLE IS TINY - JUST THE SIZE OF
THIS DOT (.).  WHEN IT HIDES BEHIND
A DOT YOU CAN'T SEE IT.  A HURKLE
WILL HIDE BEHIND ONE OF 100 DOTS IN
A GRID.  THE GRID LOOKS LIKE THIS:


PRESS RETURN TO CONTINUE...
```

In Mac's presentation, the Hurkle may be hiding behind any one of 100 dots on your screen. These dots are arranged in a grid that looks like this:

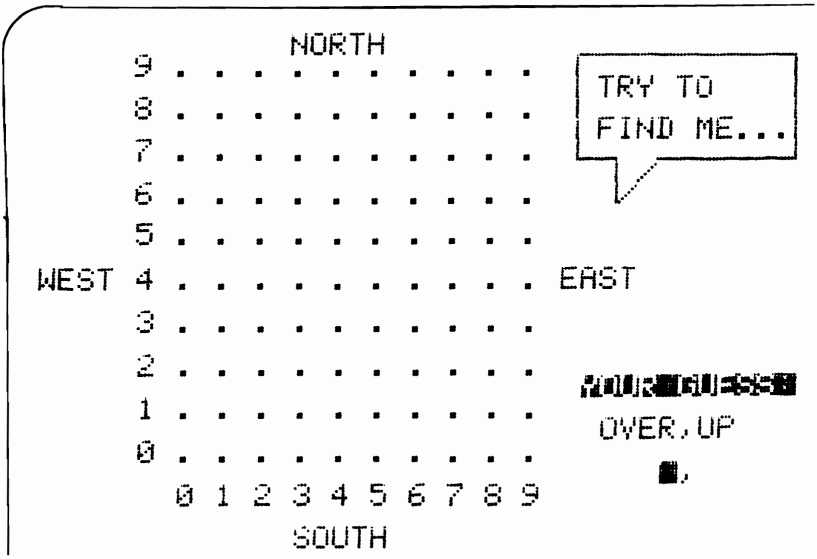


```
                 NORTH
       9 . . . . . . . . . .
       8 . . . . . . . . . .
       7 . . . . . . . . . .
       6 . . . . . . . . . .
       5 . . . . . . . . . .
  WEST 4 . . . . . . . . . .  EAST
       3 . . . . . . . . . .
       2 . . . . . . . . . .
       1 . . . . . . . . . .
       0 . . . . . . . . . .
         0 1 2 3 4 5 6 7 8 9
                 SOUTH
     PRESS RETURN TO CONTINUE...
```



```
TRY TO GUESS WHERE THE HURKLE IS
HIDING.  YOU GUESS BY TYPING IN 2
NUMBERS.  FIRST, GIVE THE DISTANCE
OVER TO THE RIGHT FROM DOT 0,0.
THEN GIVE THE DISTANCE UP.  REMEM-
BER; OVER, UP.  AFTER EACH GUESS THE
HURKLE WILL HELP YOU.  GOOD LUCK!

PRESS RETURN TO START...
```

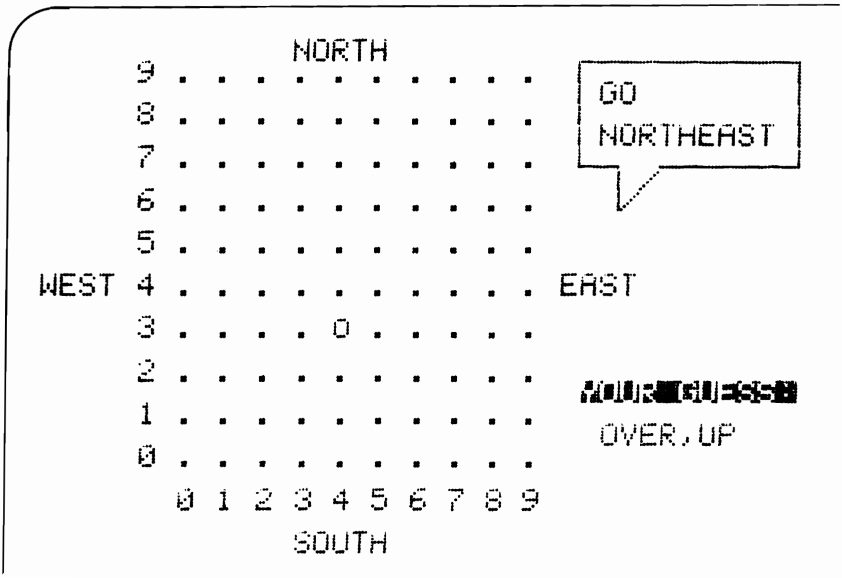
Don't get discouraged! Your friend, the Hurkle, will stay put until you find him. He'll also help you by giving you hints and clues as to his whereabouts.



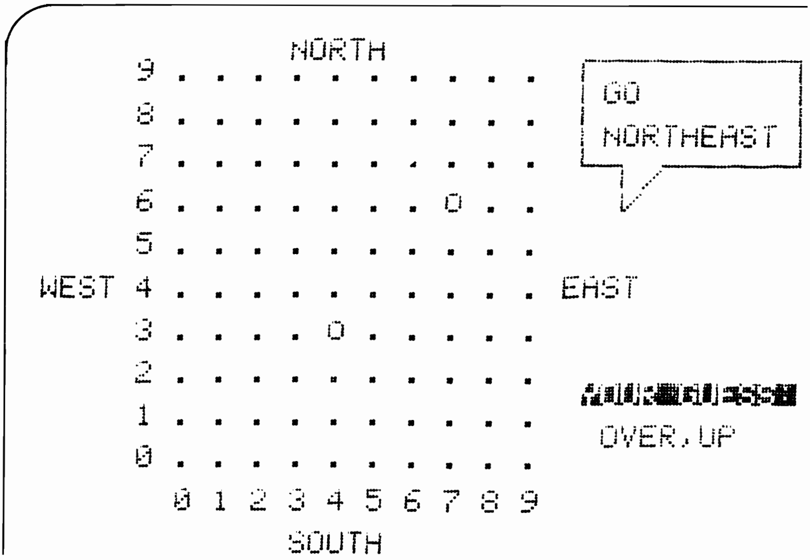
```
              NORTH
     9 . . . . . . . . . .      TRY TO
     8 . . . . . . . . . .      FIND ME...
     7 . . . . . . . . . .
     6 . . . . . . . . . .
     5 . . . . . . . . . .
WEST 4 . . . . . . . . . . EAST
     3 . . . . . . . . . .
     2 . . . . . . . . . .      [illegible]
     1 . . . . . . . . . .       OVER,UP
     0 . . . . . . . . . .          ■,
       0 1 2 3 4 5 6 7 8 9
              SOUTH
```

To make your guess, you type in *two* numbers—OVER and UP. The first number is the distance OVER to the right from Dot 0,0. The second number is the distance UP from the bottom of the grid—for example: 4,3.

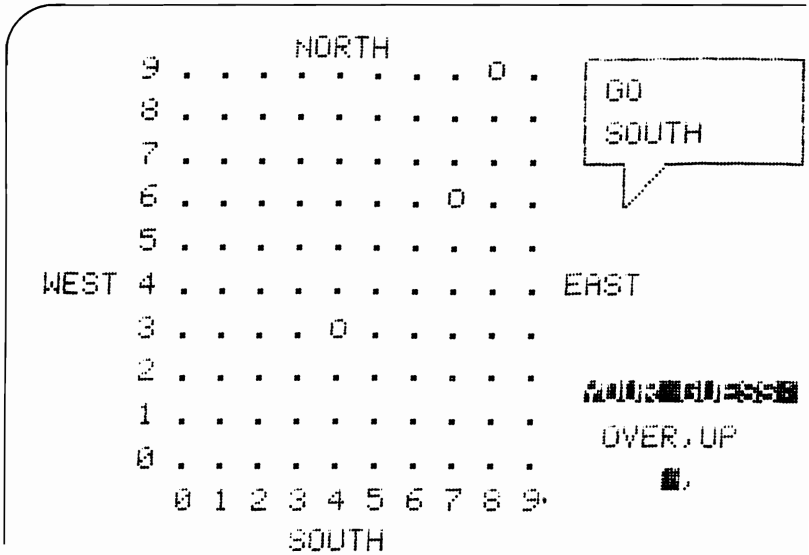
The Hurkle-in-hiding will now begin to give you hints. After each guess, the Hurkle will give you directional clues, such as:



```
              NORTH
     9 . . . . . . . . . .      GO
     8 . . . . . . . . . .      NORTHEAST
     7 . . . . . . . . . .
     6 . . . . . . . . . .
     5 . . . . . . . . . .
WEST 4 . . . . . . . . . . EAST
     3 . . . . O . . . . .
     2 . . . . . . . . . .      [illegible]
     1 . . . . . . . . . .       OVER,UP
     0 . . . . . . . . . .
       0 1 2 3 4 5 6 7 8 9
              SOUTH
```



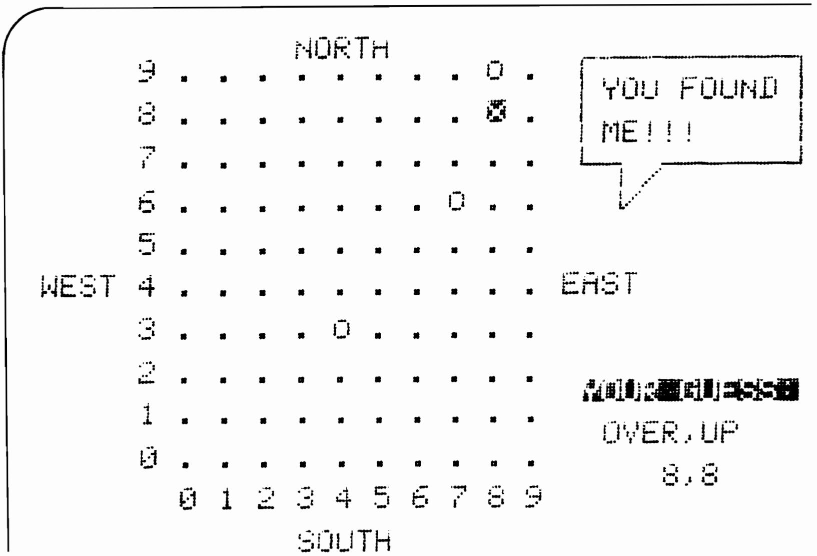
```
              NORTH
      9 . . . . . . . . . .      GO
      8 . . . . . . . . . .      NORTHEAST
      7 . . . . . . . . . .
      6 . . . . . . . O . .
      5 . . . . . . . . . .
 WEST 4 . . . . . . . . . .  EAST
      3 . . . . O . . . . .
      2 . . . . . . . . . .      [illegible]
      1 . . . . . . . . . .       OVER,UP
      0 . . . . . . . . . .
        0 1 2 3 4 5 6 7 8 9
              SOUTH
```



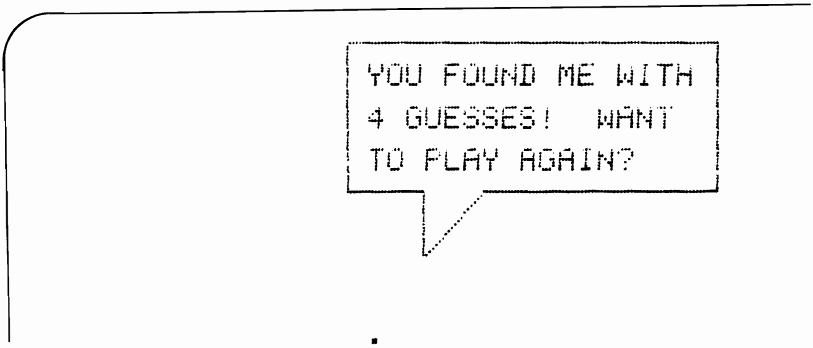
```
              NORTH
      9 . . . . . . . . O .      GO
      8 . . . . . . . . . .      SOUTH
      7 . . . . . . . . . .
      6 . . . . . . . O . .
      5 . . . . . . . . . .
 WEST 4 . . . . . . . . . .  EAST
      3 . . . . O . . . . .
      2 . . . . . . . . . .      [illegible]
      1 . . . . . . . . . .       OVER,UP
      0 . . . . . . . . . .
        0 1 2 3 4 5 6 7 8 9.
              SOUTH
```

Your guess is also marked on the grid to help you keep your bearings. Your helpful Hurkle will continue to give you clues as the game progresses and you narrow down the area where he is hiding.

When you've found him, the happy Hurkle dances out to tell you how many guesses it took you to figure out his hiding place:



```
              NORTH
     9 . . . . . . . . O .      YOU FOUND
     8 . . . . . . . . ▩ .      ME!!!
     7 . . . . . . . . . .
     6 . . . . . . . O . .
     5 . . . . . . . . . .
WEST 4 . . . . . . . . . .  EAST
     3 . . . . O . . . . .
     2 . . . . . . . . . .      [illegible]
     1 . . . . . . . . . .       OVER,UP
     0 . . . . . . . . . .          8,8
       0 1 2 3 4 5 6 7 8 9
              SOUTH
```



```
YOU FOUND ME WITH
4 GUESSES!  WANT
TO PLAY AGAIN?
```

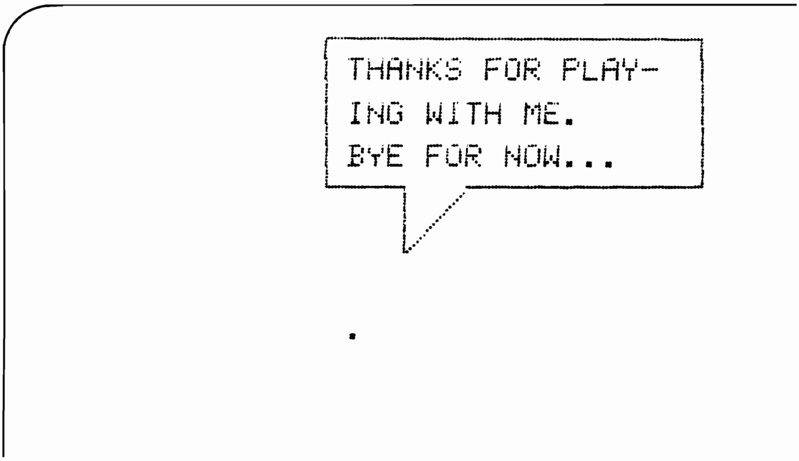
Note: The Hurkle is rather shy, though very friendly, so it will remain concealed behind a dot.

You don't *have* to learn anything while you're playing *Hurkle*, (after all, it's a game for your enjoyment). However, you may not be able to help it. Cleverly concealed in this game, in addition to our tiny friend, are several math concepts. Playing *Hurkle* can help you understand:

- The Cartesian Coordinate system (x,y)
- Compass (Map) Directions—(north, south, southeast, and so on)
- The intersection of sets—(As in the set of all points south and east of your guess)
- Strategy.

Using your new-found knowledge, you can develop a system to locate the hiding Hurkle in fewer and fewer guesses. The Hurkle won't mind—he just wants to play. The only thing that hurts his feelings is when you give up and leave him languishing behind his dot. You wouldn't want to do that!

Level A-B: This highly enjoyable game is still good for beginners. It's also a sophisticated learning tool for the concepts mentioned above.



```
THANKS FOR PLAY-
ING WITH ME.
BYE FOR NOW...
```

```
100 REM *** HURKLE ***
110 REM
120 REM THIS VERSION OF HURKLE IS
130 REM (C) 1980 MAC OGLESBY
140 REM
150 REM LAST REVISION 2/15/80  16:35
160 REM
170 REM CHANGED 3/2/80: REMOVED
180 REM    SCREEN PRINT OPTION
190 REM
200 REM CHANGED 4/9/80: REMOVED EXTRA
210 REM    "THE" FROM LINE 9260
220 REM
1000 REM INITIALIZATION
1010 POKE 59468,12:REM GRAPHICS MODE
1020 X=RND(-TI)
1030 PRINT "ĥ";
1100 DIM M$(25)
1200 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":
     ¬REM 24 DOWN
1210 ZS$="                               ¬
     ¬          ":REM 40 SPACES
1220 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
     ¬→→→→→→→→→→":REM 40 RIGHT
1250 GI$=LEFT$(ZD$,20)+LEFT$(ZR$,32)
1260 FOR J=1 TO 25
1270 :READ M$(J)
1280 NEXT
1290 REM BALLOON BORDER DIRECTIONS:
     ¬ BD$=DOWN, BL$=LEFT, BU$=UP
1300 BD$="↓←":BL$="←←":BU$="↑←"
1310 P1=4:P1$="   ↓←←←←'  N↓←←←←' ¬
     ¬N↓←←←'N":REM LARGE POINTER
1320 P2=2:P2$="  ↓←←←' N↓←←←'N":
     ¬REM SMALL POINTER
1400 GOSUB 6500
1990 REM BALLOON SIZE: L0=LENGTH,
     ¬ W0=WIDTH
1995 REM LOCATION OF UPPER LEFT CORNER:
     ¬ WR=DOWN, WC=RIGHT
2040 GOSUB 6000
2100 FOR J=1 TO 3
```

```
2110 :PRINT WM$;LEFT$(ZD$,2*J-1);:
      ¬XX$= M$(J):GOSUB 1Ø5ØØ
212Ø NEXT
241Ø GOSUB 1Ø3ØØ
242Ø IF XA$<>"Y" THEN 29ØØ
243Ø PRINT "ĥ";
244Ø WR=1:WC=1:LØ=38:WØ=18
2445 GOSUB 6ØØØ
245Ø GOSUB 85ØØ
246Ø GOSUB 7999
247Ø FOR J=1 TO 6
248Ø :PRINT WM$;LEFT$(ZD$,2*J-1);:
      ¬XX$=M$(J+3):GOSUB 1Ø5ØØ
249Ø NEXT
25ØØ GOSUB 1Ø3ØØ
251Ø GOSUB 8ØØØ
252Ø PRINT "h̲";ZD$;"    PRESS r̲RETURNr̂ ¬
      ¬TO CONTINUE...";
253Ø GOSUB 1Ø3ØØ:PRINT "ĥ";:GOSUB 85ØØ
254Ø FOR J=1 TO 8
255Ø :PRINT WM$;LEFT$(ZD$,2*J-1);:
      ¬XX$=M$(J+9):GOSUB 1Ø5ØØ
256Ø NEXT
257Ø GOSUB 1Ø3ØØ
29ØØ NN=Ø:GOSUB 8ØØØ
291Ø WR=1:WC=28:LØ=11:WØ=5
292Ø GOSUB 6ØØØ
293Ø BP=P2:BP$=P2$:GOSUB 85ØØ
295Ø FOR J=1 TO 2
296Ø :PRINT WM$;LEFT$(ZD$,2*J-1);:
      ¬XX$=M$(J+17):GOSUB 1Ø5ØØ
297Ø NEXT
3ØØØ X=INT(1Ø*RND(1))
3Ø1Ø Y=INT(1Ø*RND(1))
3Ø2Ø PRINT "h̲";LEFT$(ZD$,16);LEFT$(ZR$,
      ¬28);
3Ø3Ø PRINT "r̲YOUR GUESS:r̂↓↓←←←←←←←←←←OVE
      ¬R,UP"
31ØØ PRINT "h̲";GI$;" , ←←←";
31Ø5 F=1
311Ø GET XA$:IF XA$<>"" THEN 311Ø
312Ø GET XA$
```

```
3130 IF XA$<>"" THEN 3300
3180 PRINT "r r̂";
3200 GOSUB 7200
3210 PRINT "← ←";
3220 GOSUB 7200
3230 GOTO 3120
3300 IF ASC(XA$)=>48 AND ASC(XA$)<58 ¬
      ¬THEN 3400
3310 PRINT "h";ZD$;"   rPLEASE TYPE A ¬
      ¬NUMBER FROM 0 TO 9r̂";:E=1:
      ¬GOTO 3100
3400 XA=VAL(XA$):X(F)=XA:IF F=2 THEN ¬
      ¬3500
3410 F=2:IF E=0 THEN PRINT XA$; "→";:
      ¬GOTO 3110
3420 E=0:PRINT "h";ZD$;LEFT$(ZS$,
      ¬39);"h";GI$;XA$;"→";:GOTO 3110
3500 PRINT XA$:NN=NN+1
3505 PRINT WM$;"↓          ↓↓←←←←←←←←←←←
      ¬           "
3510 IF X<>X(1) OR Y<>X(2) THEN 3600
3520 D$="rVr̂"
3530 GOSUB 8800
3540 PRINT WM$;"↓";:XX$="YOU FOUND":
      ¬GOSUB 10500
3550 PRINT WM$;"↓↓↓";:XX$="ME!!      ":
      ¬GOSUB 10500
3560 GOTO 4000
3600 D$="W"
3610 GOSUB 8800
3710 PRINT WM$;"↓";:XX$="GO":GOSUB ¬
      ¬10500:PRINT "↓↓←←";
3720 IF Y>X(2) THEN XX$="NORTH":
      ¬GOSUB 10500
3730 IF Y<X(2) THEN XX$="SOUTH":
      ¬GOSUB 10500
3760 IF X>X(1) THEN XX$="EAST":GOSUB ¬
      ¬10500
3770 IF X<X(1) THEN XX$="WEST":GOSUB ¬
      ¬10500
3900 GOTO 3100
4000 REM WRAP IT UP
```

```
4100 FOR J=1 TO 3
4110 :GOSUB 7300
4120 :POKE 59409,52
4130 :GOSUB 7300
4140 :POKE 59409,60
4150 NEXT
4200 GOSUB 7500
4300 GOSUB 6500
4310 GOSUB 6000
4320 FOR J=1 TO 3
4330 :PRINT WM$;LEFT$(ZD$,2*J-1);
4340 :IF J<>2 THEN 4370
4350 :PRINT "←";STR$(NN);:IF NN=1 THEN ¬
      ¬M$(21)=" GUESS!  WANT"
4370 :XX$=M$(J+19):GOSUB 10500
4380 NEXT
4400 GOSUB 10300
4410 IF XA$="Y" THEN 2900:REM REPLAY
4420 FOR J=1 TO 3
4430 :PRINT WM$;LEFT$(ZD$,2*J-1);LEFT$(Z
      ¬S$,17)
4440 NEXT
4450 FOR J=1 TO 3
4460 :PRINT WM$;LEFT$(ZD$,2*J-1);:
      ¬XX$=M$(J+22):GOSUB 10500
4470 NEXT
4500 GOSUB 7300
4510 PRINT "h̲";LEFT$(ZD$,14);LEFT$(ZR$,
      ¬19);
4520 FOR J=1 TO 6
4530 :PRINT "← ←←↑.";:GOSUB 7025
4540 :PRINT "← ←←.";:GOSUB 7025
4550 :PRINT "← ←←↓.";:GOSUB 7100
4560 NEXT
4570 GOSUB 7300
4580 PRINT "← "
4590 GOSUB 7500
4600 PRINT "ĥ":END
6000 REM
6010 MD$=LEFT$(ZD$,WR):MR$=LEFT$(ZR$,
      ¬WC+1):WM$="h̲"+MD$+MR$
6020 RETURN
```

```
6500 REM HURKLE'S ENTRANCE
6600 GOSUB 7500
6610 PRINT "ĥ";
6620 PRINT LEFT$(ZD$,14);
6630 PRINT".";
6640 GOSUB 7100
6700 FOR J=1 TO 6
6710 :PRINT "← ↑.";:GOSUB 7050
6720 :PRINT "← .";:GOSUB 7050
6730 :PRINT "← ↓.";:GOSUB 7100
6740 NEXT J
6750 GOSUB 7800
6800 WR=1:WC=17:L0=19:W0=7
6810 PRINT "h̲";
6820 BP=P1:BP$=P1$:GOSUB 8500
6830 GOSUB 7999
6900 RETURN
7000 REM VARIOUS DELAYS
7025 FOR Z=1 TO 25:NEXT:RETURN
7050 FOR Z=1 TO 50:NEXT:RETURN
7100 FOR Z=1 TO 100:NEXT:RETURN
7200 FOR Z=1 TO 200:NEXT:RETURN
7300 FOR Z=1 TO 300:NEXT:RETURN
7500 FOR Z=1 TO 500:NEXT:RETURN
7800 FOR Z=1 TO 800:NEXT:RETURN
7999 FOR Z=1 TO 999:NEXT:RETURN
8000 REM PRINT BOARD
8100 PRINT "ĥ";LEFT$(ZR$,13);"NORTH"
8120 FOR J=9 TO 0 STEP-1
8130 :IF J=4 THEN PRINT "WEST 4 . . . . ¬
      ¬. . . . . . EAST":GOTO 8180
8140 :PRINT TAB(4);J;". . . . . . . . . . ¬
      ¬."
8180 PRINT
8200 NEXT
8220 PRINT TAB(7);"0 1 2 3 4 5 6 7 8 9"
8230 PRINT
8240 PRINT TAB(13);"SOUTH"
8490 RETURN
8500 REM PRINT SPEECH BALLOONS
8510 PRINT "h̲";LEFT$(ZR$,WC);LEFT$(ZD$,
      ¬WR);
```

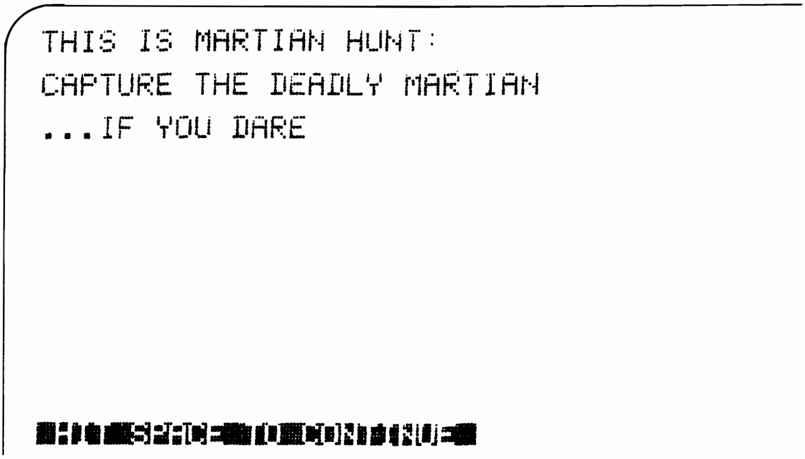
```
8600 FOR J1=1 TO L0:PRINT "#";:NEXT J1
8610 FOR J1=1 TO W0-1:PRINT "%";BD$;:
      ¬NEXT J1:PRINT "%";
8620 FOR J1=1 TO L0:PRINT BL$;"$";:
      ¬NEXT J1:PRINT BL$;
8630 FOR J1=1 TO W0-1:PRINT "!";BU$;:
      ¬NEXT J1:PRINT "!"
8700 PRINT "h";LEFT$(ZR$,WC+BP);LEFT$(ZD
      ¬$,WR+W0-1);
8710 PRINT BP$
8750 RETURN
8800 REM UPDATE BOARD
8850 PRINT "h";
8860 PRINT LEFT$(ZD$,19-2*X(2));
8870 PRINT LEFT$(ZR$,7+2*X(1));
8880 PRINT D$
8890 RETURN
8990 RETURN
9000 REM
9100 DATA HELLO THERE!  I'M,A HURKLE!  ¬
      ¬DO YOU,NEED THE RULES?
9120 DATA "A HURKLE IS TINY @ JUST THE ¬
      ¬SIZE OF"
9130 DATA THIS DOT (.).  WHEN IT HIDES ¬
      ¬BEHIND
9140 DATA A DOT YOU CAN'T SEE IT.  A ¬
      ¬HURKLE
9150 DATA WILL HIDE BEHIND ONE OF 100 ¬
      ¬DOTS IN
9160 DATA "A GRID.  THE GRID LOOKS LIKE ¬
      ¬THIS:"
9170 DATA "↓↓↓↓PRESS rRETURNr̂ TO ¬
      ¬CONTINUE..."
9200 DATA TRY TO GUESS WHERE THE HURKLE ¬
      ¬IS
9210 DATA HIDING.  YOU GUESS BY TYPING ¬
      ¬IN 2
9220 DATA "NUMBERS.  FIRST, GIVE THE ¬
      ¬DISTANCE"
9230 DATA "OVER TO THE RIGHT FROM DOT 0,
      ¬0."
9240 DATA "THEN GIVE THE DISTANCE UP.  ¬
      ¬REMEM-"
```

```
 925Ø DATA "BER; OVER, UP.  AFTER EACH ¬
        ¬GUESS THE"
 926Ø DATA HURKLE WILL HELP YOU.  GOOD ¬
        ¬LUCK!
 927Ø DATA "↓PRESS r̲RETURNr̂ TO START..."
 93ØØ DATA TRY TO,FIND ME...
 94ØØ DATA YOU FOUND ME WITH," GUESSES!  ¬
        ¬WANT"
 941Ø DATA TO PLAY AGAIN?
 942Ø DATA THANKS FOR PLAY-,ING WITH ME.,
        ¬BYE FOR NOW...
 1ØØØØ REM GET 1 CHARACTER
 1Ø3ØØ GET XA$:IF XA$<>"" THEN 1Ø3ØØ
 1Ø31Ø GET XA$:IF XA$="" THEN 1Ø31Ø
 1Ø35Ø RETURN
 1Ø5ØØ REM SLOW PRINTER
 1Ø52Ø FOR XX=1 TO LEN(XX$)
 1Ø53Ø :PRINT MID$(XX$,XX,1);
 1Ø55Ø :FOR K=1 TO 25:NEXT K
 1Ø56Ø NEXT XX
 1Ø599 RETURN
READY.
```

Martian Hunt

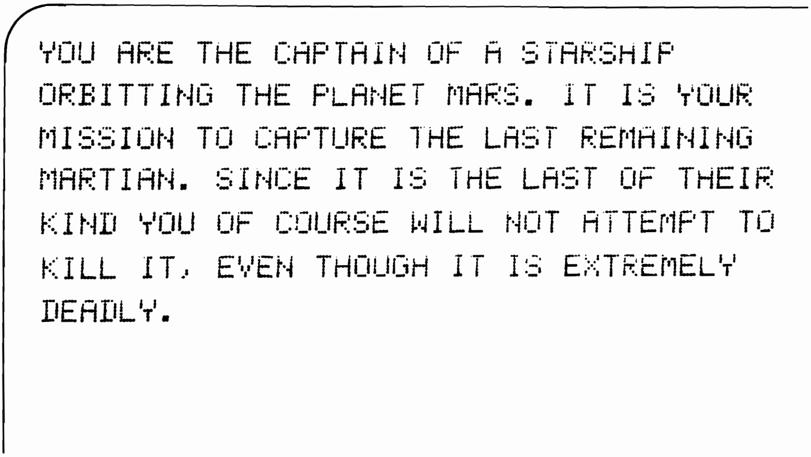
by Len Lindsay

One of the reasons Len invented *Martian Hunt* is that he got tired of all those spacewar games where your mission is to ZAP some unfortunate alien. If you turned to this page because you were in the mood to ZAP all those dirty Martians before they ZAP us, it's time for you to shift gears. Martians can in fact be devious and deadly. (See *The Martian Chronicles* by Ray Bradbury.) However, there's no more reason to worry about wiping out Martians, because it's all been taken care of. A colonist from Earth left the germs of the common cold, along with a beer can and a crumpled take-out container from the Interterrestrial Golden Arches. The Martians sneezed themselves to death. All but one. Your mission is to capture this dangerous, but precious, Martian—*unharmed*. It's our only chance to learn about their culture and accomplishments. This mission is of vital importance to our knowledge of Outer Space. Captain, we're depending on you.



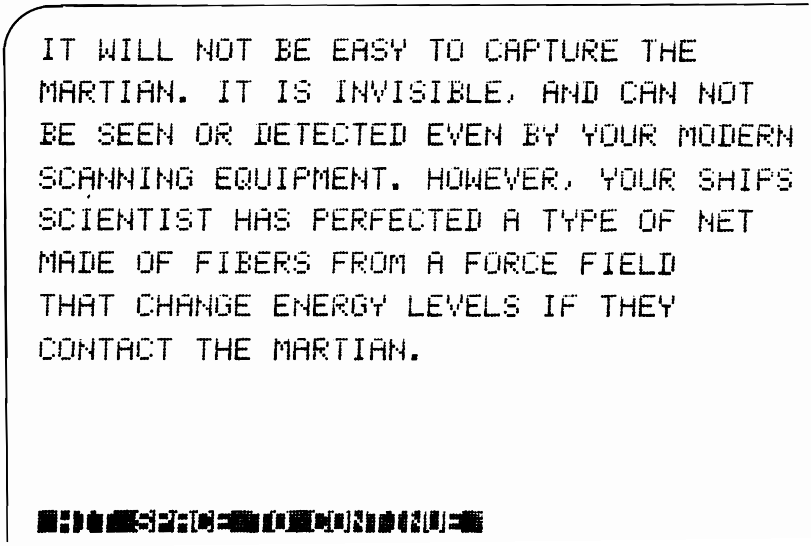
```
THIS IS MARTIAN HUNT:
CAPTURE THE DEADLY MARTIAN
...IF YOU DARE
```

[illegible]

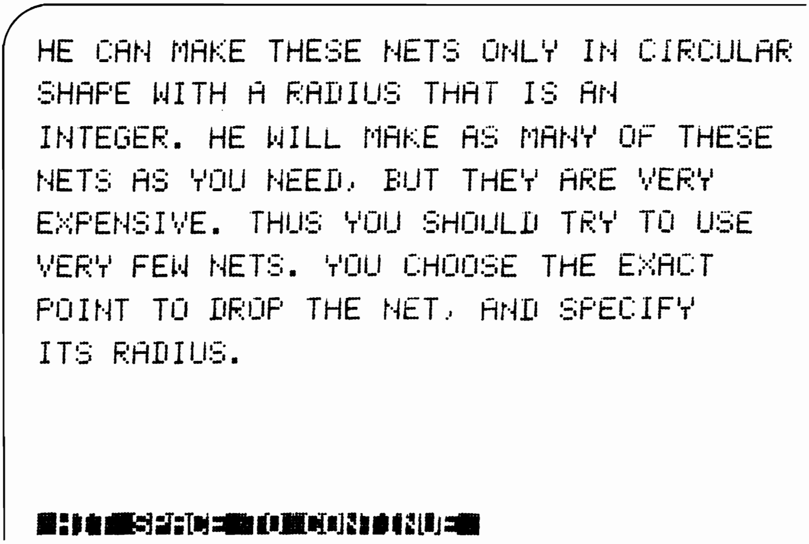


```
YOU ARE THE CAPTAIN OF A STARSHIP
ORBITTING THE PLANET MARS. IT IS YOUR
MISSION TO CAPTURE THE LAST REMAINING
MARTIAN. SINCE IT IS THE LAST OF THEIR
KIND YOU OF COURSE WILL NOT ATTEMPT TO
KILL IT, EVEN THOUGH IT IS EXTREMELY
DEADLY.
```

A scientist from your ship has developed a special fiber that changes energy levels when it comes into contact with the Martian. The fiber is in the shape of a circular net. As you may have guessed, the special fiber is very expensive to manufacture, and you're on a



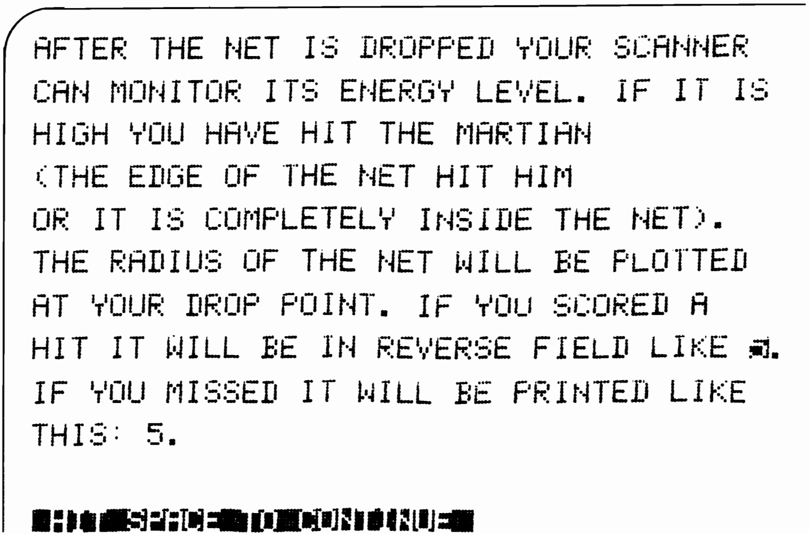
```
IT WILL NOT BE EASY TO CAPTURE THE
MARTIAN. IT IS INVISIBLE, AND CAN NOT
BE SEEN OR DETECTED EVEN BY YOUR MODERN
SCANNING EQUIPMENT. HOWEVER, YOUR SHIPS
SCIENTIST HAS PERFECTED A TYPE OF NET
MADE OF FIBERS FROM A FORCE FIELD
THAT CHANGE ENERGY LEVELS IF THEY
CONTACT THE MARTIAN.



[illegible]
```



```
HE CAN MAKE THESE NETS ONLY IN CIRCULAR
SHAPE WITH A RADIUS THAT IS AN
INTEGER. HE WILL MAKE AS MANY OF THESE
NETS AS YOU NEED, BUT THEY ARE VERY
EXPENSIVE. THUS YOU SHOULD TRY TO USE
VERY FEW NETS. YOU CHOOSE THE EXACT
POINT TO DROP THE NET, AND SPECIFY
ITS RADIUS.




 HIT SPACE TO CONTINUE
```

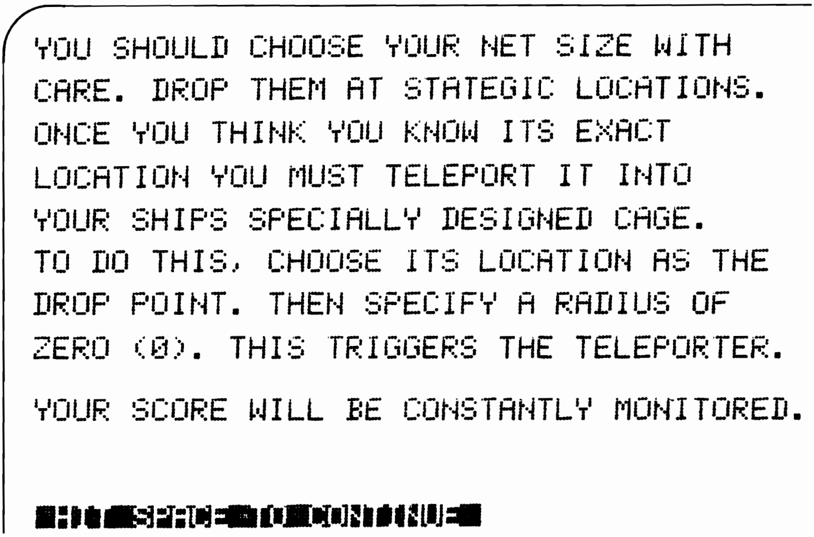
strict budget from the OGDOD (Outer Galactic Department of Defense).

Not only do you have to capture the Martian alive, but you have to do it with the fewest number of nets and with the smallest net possible!

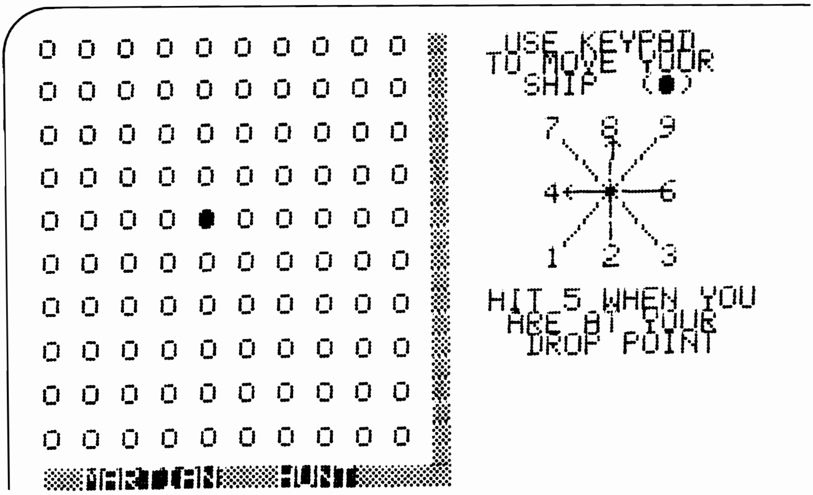


```
AFTER THE NET IS DROPPED YOUR SCANNER
CAN MONITOR ITS ENERGY LEVEL. IF IT IS
HIGH YOU HAVE HIT THE MARTIAN
(THE EDGE OF THE NET HIT HIM
OR IT IS COMPLETELY INSIDE THE NET).
THE RADIUS OF THE NET WILL BE PLOTTED
AT YOUR DROP POINT. IF YOU SCORED A
HIT IT WILL BE IN REVERSE FIELD LIKE 5.
IF YOU MISSED IT WILL BE PRINTED LIKE
THIS: 5.

 HIT SPACE TO CONTINUE
```

To do this, you drop nets in strategic locations and then narrow down the Martian's exact location. To drop a net, you maneuver your ship (the cursor) over the spot where you want the center of your net to be. Hit 5 to activate the drop process. You then specify the *radius* of the circular net you want dropped (0-9). The net is dropped, and you receive a report on whether it hit or missed:



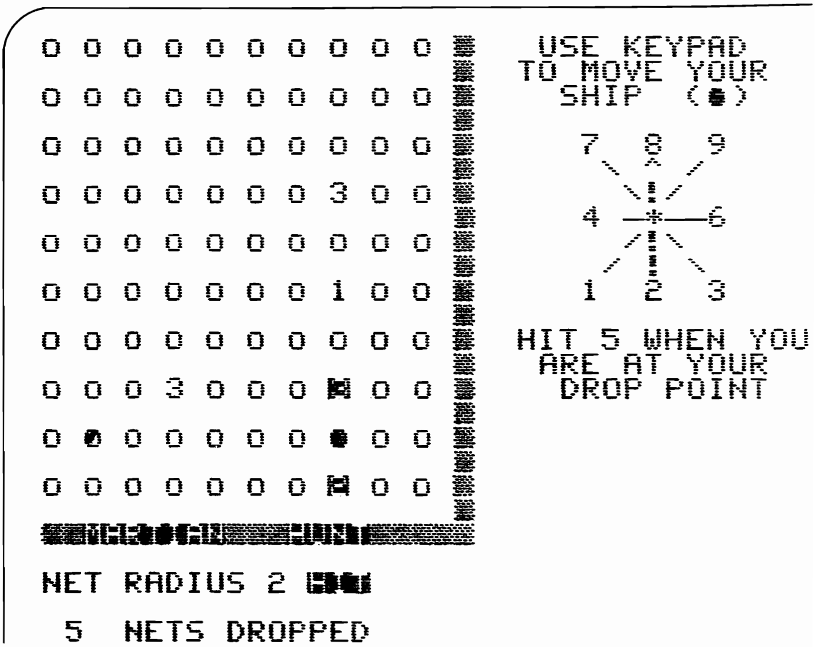
```
YOU SHOULD CHOOSE YOUR NET SIZE WITH
CARE. DROP THEM AT STATEGIC LOCATIONS.
ONCE YOU THINK YOU KNOW ITS EXACT
LOCATION YOU MUST TELEPORT IT INTO
YOUR SHIPS SPECIALLY DESIGNED CAGE.
TO DO THIS, CHOOSE ITS LOCATION AS THE
DROP POINT. THEN SPECIFY A RADIUS OF
ZERO (0). THIS TRIGGERS THE TELEPORTER.

YOUR SCORE WILL BE CONSTANTLY MONITORED.


HIT SPACE TO CONTINUE
```



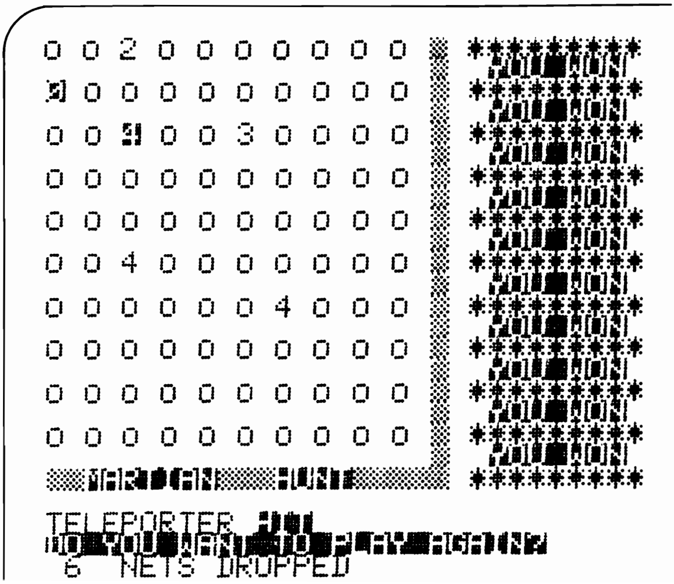
```
O O O O O O O O O O
O O O O O O O O O O
O O O O O O O O O O
O O O O O O O O O O
O O O O ● O O O O O
O O O O O O O O O O
O O O O O O O O O O
O O O O O O O O O O
O O O O O O O O O O
O O O O O O O O O O
MARTIAN HUNT
```

USE KEYPAD
TO MOVE YOUR
SHIP (●)

HIT 5 WHEN YOU
ARE AT YOUR
DROP POINT



```
0 0 0 0 0 0 0 0 0 0      USE KEYPAD
0 0 0 0 0 0 0 0 0 0     TO MOVE YOUR
0 0 0 0 0 0 0 0 0 0      SHIP  (●)
0 0 0 0 0 0 0 3 0 0
0 0 0 0 0 0 0 0 0 0       7   8   9
0 0 0 0 0 0 0 1 0 0
0 0 0 0 0 0 0 0 0 0       4 --*-- 6
0 0 0 3 0 0 0 ▪ 0 0
0 ● 0 0 0 0 0 ● 0 0       1   2   3
0 0 0 0 0 0 0 ▪ 0 0
                        HIT 5 WHEN YOU
                         ARE AT YOUR
                          DROP POINT
NET RADIUS 2
 5  NETS DROPPED
```



```
0 0 2 0 0 0 0 0 0 0
▪ 0 0 0 0 0 0 0 0 0
0 0 ▪ 0 0 3 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 4 0 0 0 0 0 0 0
0 0 0 0 0 0 4 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0

TELEPORTER
 6  NETS DROPPED
```

This mission is a real challenge! To make it a little easier, you should be aware that the Martian will not attack you, because it senses that you're not trying to kill it. It will also stay in the same place—(why not? it knows it's invisible).

Captain Lindsay also recommends that you take along into space a piece of graph paper to help you with your strategy. Draw the circles of the nets you've dropped. Color in the ones that missed and *eliminate* those areas. Try different methods of narrowing down the Martian's location to one spot. Can you come up with a foolproof strategy? Meanwhile, you'll be learning about intersecting circles. Captain, bring him back alive!

Martian Hunt is designed for all PET models, old and new. Lines 20 and 21 were added specifically for the new 80-column CBM 8032 and 8016.

Businesspeople in Outer Space may have some small problems. If you have a *Business Model Keyboard*, replace the symbol for "pi" (π) in Line 507 with the value 3.14159. Type:

```
507 NC=INT(3.14*R*R)
```

Lines 6020, 6030, and 6050 use a SHIFT "&" for a gray box. Replace it with any other character of your choice.

Level B: This game isn't easy, but it's so much fun!

```
Ø REM*** WORKS ON PET 2ØØ1-8, NEW ¬
     ¬PET/CBM, & BASIC 4.Ø
1 REM***MARTIAN HUNT***
2 REM***ORIGINAL PROGRAM BY LEN LINDSAY
3 REM***Ø1-18-8Ø
4 REM***(C) 198Ø
5 REM***USES MAIN SUBROUTINES 1Ø1ØØ,
     ¬ 1Ø5ØØ
1Ø POKE59468,12 : REM GRAPHIC MODE
15 XQ=RND(-TI) : REM SEED RND
2Ø PRINT"ĥ"; : REM CLEAR SCREEN
4Ø DEF FNR(N)=INT(RND(1)*N+1) : REM RND#
5Ø REM
51 ZZ$="" :
     ¬ REM 21 DELETE
```

```
54 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→" ¬
     ¬: REM 3Ø RIGHT
56 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓" :
     ¬ REM 22 DOWN
58 ZS$="                     " :
     ¬ REM 21 SPACE
6Ø RM$="h̲"+ZD$+ZS$+ZZ$
89 IFNG>ØTHEN1ØØ
9Ø PRINT"DO YOU NEED INSTRUCTIONS?" :
     ¬ GOSUB 1Ø13Ø
95 IFXA$="Y"THEN GOSUB 5ØØØ : REM ¬
     ¬INSTRUCTIONS
1ØØ XØ=FNR(1Ø) : YØ=FNR(1Ø) : REM PICK ¬
     ¬HIDDEN POINT
1Ø5 ND=Ø :REM INITIALIZE
11Ø GOSUB 6ØØØ : REM DRAW BOARD
12Ø X=5 : Y=5 : REM INIT STARTING ¬
     ¬LOCATION OF MARKER
2ØØ ML=32768+8Ø*(Y-1)+2*(X-1) : REM ¬
     ¬CURRENT MARKER LOCATION
21Ø MC=PEEK(ML) : REM MARKER CHARACTER
22Ø POKE ML, 81 : REM HIGHLIGHT MARKER ¬
     ¬LOCATION
23Ø GOSUB 1Ø14Ø : REM GET NEXT MARKER ¬
     ¬MOVE
24Ø POKE ML, MC : REM RETURN MARKER ¬
     ¬LOCATIN TO NORMAL
25Ø IF XA=Ø THEN 22Ø : REM ILLEGAL ¬
     ¬CHOICE
26Ø ON XA GOSUB 31Ø,32Ø,33Ø,34Ø,35Ø,36Ø,
     ¬37Ø,38Ø,39Ø
27Ø IF XA=5 THEN POKEML,81:GOTO4ØØ :
     ¬ REM GET RADIUS NEXT
28Ø IFX>1Ø THEN X=1Ø
285 IFY>1Ø THEN Y=1Ø
29Ø IFX<1THEN X=1
295 IFY<1THEN Y=1
3ØØ GOTO2ØØ
31Ø X=X-1:Y=Y+1:RETURN
32Ø Y=Y+1:RETURN
33Ø X=X+1:Y=Y+1:RETURN
34Ø X=X-1:RETURN
35Ø RETURN
```

```
360 X=X+1:RETURN
370 X=X-1:Y=Y-1:RETURN
380 Y=Y-1:RETURN
390 X=X+1:Y=Y-1:RETURN
400 GOSUB7000 : REM CLEAR RIGHT AREA
405 PRINT"h̲";
410 FORZ=9TO1 STEP -1
420 :PRINT TAB(24);Z
430 :PRINT
440 NEXT Z
450 PRINT TAB(22);"OR 0 (TELEPORT)"
460 PRINT
465 PRINT TAB(21);"OR r̲Xr̂ (CANCEL DROP)"
466 PRINT
470 PRINT TAB(22);"r̲WHAT RADIUSr̂?"
480 GOSUB10130
485 IFXA$="X"THEN GOSUB7000: GOSUB6800 :
      ¬ POKEML,MC:GOTO200 : REM REDO DROP
490 IF XA=0 AND XA$<>"0" THEN 480
495 ND=ND+1 : REM UPDATE NET DROP COUNT
500 POKE ML, 42
505 R=XA : REM RADIUS
510 GOSUB7200:REM CHECK IF IN NET
515 GOSUB7000:REM CLEAR RIGHT AREA
517 IFR=0 THEN GOSUB 7300 : GOTO 525 :
      ¬ REM TELEPORTER ON
520 PRINTRM$;"NET RADIUS";R;NT$
525 PRINT:GOSUB7100:REM UPDATE NET
530 GOSUB6800
540 GOTO200
4999 END
5000 PRINT"ĥ"; : REM INSTRUCTIONS
5005 PRINT"↓↓↓↓↓↓↓↓"
5010 XX$="THIS IS MARTIAN HUNT:" :
      ¬ GOSUB10500
5015 PRINT
5020 XX$="CAPTURE THE DEADLY MARTIAN" :
      ¬ GOSUB 10500
5025 PRINT
5030 XX$="...IF YOU DARE" : GOSUB 10500
5035 PRINT RM$;
5040 GOSUB10100
5100 PRINT"ĥ";
```

```
5110 XX$="YOU ARE THE CAPTAIN OF A ¬
       ¬STARSHIP" : GOSUB 10500
5115 PRINT
5120 XX$="ORBITTING THE PLANET MARS. IT ¬
       ¬IS YOUR" : GOSUB 10500
5125 PRINT
5130 XX$="MISSION TO CAPTURE THE LAST ¬
       ¬REMAINING" : GOSUB 10500
5135 PRINT
5140 XX$="MARTIAN. SINCE IT IS THE LAST ¬
       ¬OF THEIR" : GOSUB 10500
5145 PRINT
5150 XX$="KIND YOU OF COURSE WILL NOT ¬
       ¬ATTEMPT TO" : GOSUB10500
5155 PRINT
5160 XX$="KILL IT, EVEN THOUGH IT IS ¬
       ¬EXTREMELY" : GOSUB10500
5165 PRINT
5170 XX$="DEADLY." : GOSUB 10500
5180 PRINT RM$;
5190 GOSUB 10100
5200 PRINT"ĥ";
5210 XX$="IT WILL NOT BE EASY TO ¬
       ¬CAPTURE THE" : GOSUB 10500
5215 PRINT
5220 XX$="MARTIAN. IT IS INVISIBLE,
       ¬ AND CAN NOT" : GOSUB 10500
5225 PRINT
5230 XX$="BE SEEN OR DETECTED EVEN BY ¬
       ¬YOUR MODERN" : GOSUB 10500
5235 PRINT
5240 XX$="SCANNING EQUIPMENT. HOWEVER,
       ¬ YOUR SHIPS" : GOSUB 10500
5245 PRINT
5250 XX$="SCIENTIST HAS PERFECTED A ¬
       ¬TYPE OF NET" : GOSUB 10500
5255 PRINT
5260 XX$="MADE OF FIBERS FROM A FORCE ¬
       ¬FIELD" : GOSUB 10500
5265 PRINT
5270 XX$="THAT CHANGE ENERGY LEVELS IF ¬
       ¬THEY" : GOSUB 10500
5275 PRINT
```

```
528Ø XX$="CONTACT THE MARTIAN." :
      ¬ GOSUB 1Ø5ØØ
529Ø PRINTRM$;
5295 GOSUB 1Ø1ØØ
53ØØ PRINT"ĥ";
531Ø XX$="HE CAN MAKE THESE NETS ONLY ¬
      ¬IN CIRCULAR" : GOSUB 1Ø5ØØ
5315 PRINT
532Ø XX$="SHAPE WITH A RADIUS THAT IS ¬
      ¬AN" : GOSUB 1Ø5ØØ
5325 PRINT
533Ø XX$="INTEGER. HE WILL MAKE AS MANY ¬
      ¬OF THESE" : GOSUB 1Ø5ØØ
5335 PRINT
534Ø XX$="NETS AS YOU NEED, BUT THEY ¬
      ¬ARE VERY" : GOSUB 1Ø5ØØ
5345 PRINT
535Ø XX$="EXPENSIVE. THUS YOU SHOULD ¬
      ¬TRY TO USE" : GOSUB 1Ø5ØØ
5355 PRINT
536Ø XX$="VERY FEW NETS. YOU CHOOSE THE ¬
      ¬EXACT" : GOSUB 1Ø5ØØ
5365 PRINT
537Ø XX$="POINT TO DROP THE NET,
      ¬ AND SPECIFY" : GOSUB 1Ø5ØØ
5375 PRINT
538Ø XX$="ITS RADIUS." : GOSUB 1Ø5ØØ
539Ø PRINTRM$;
5395 GOSUB1Ø1ØØ
54ØØ PRINT"ĥ";
541Ø XX$="AFTER THE NET IS DROPPED YOUR ¬
      ¬SCANNER" : GOSUB 1Ø5ØØ
5415 PRINT
542Ø XX$="CAN MONITOR ITS ENERGY LEVEL. ¬
      ¬IF IT IS" : GOSUB 1Ø5ØØ
5425 PRINT
543Ø XX$="HIGH YOU HAVE HIT THE ¬
      ¬MARTIAN" : GOSUB 1Ø5ØØ
5435 PRINT
544Ø XX$="(THE EDGE OF THE NET HIT HIM" ¬
      ¬: GOSUB 1Ø5ØØ
5445 PRINT
5450 XX$="OR IT IS COMPLETELY INSIDE ¬
      ¬THE NET)." : GOSUB 10500
5453 PRINT
5455 XX$="THE RADIUS OF THE NET WILL BE ¬
      ¬PLOTTED" : GOSUB 10500
5457 PRINT
5460 XX$="AT YOUR DROP POINT. IF YOU ¬
      ¬SCORED A" : GOSUB 10500
5463 PRINT
5465 XX$="HIT IT WILL BE IN REVERSE ¬
      ¬FIELD LIKE r̲5r̂." : GOSUB 10500
5467 PRINT
5470 XX$="IF YOU MISSED IT WILL BE ¬
      ¬PRINTED LIKE" : GOSUB 10500
5473 PRINT
5475 XX$="THIS: 5." : GOSUB 10500
5490 PRINTRM$;
5495 GOSUB 10100
5500 PRINT"ĥ";
5510 XX$="YOU SHOULD CHOOSE YOUR NET ¬
      ¬SIZE WITH" : GOSUB 10500
5515 PRINT
5520 XX$="CARE. DROP THEM AT STATEGIC ¬
      ¬LOCATIONS." : GOSUB 10500
5525 PRINT
5530 XX$="ONCE YOU THINK YOU KNOW ITS ¬
      ¬EXACT" : GOSUB 10500
5535 PRINT
5540 XX$="LOCATION YOU MUST TELEPORT IT ¬
      ¬INTO" : GOSUB 10500
5545 PRINT
5560 XX$="YOUR SHIPS SPECIALLY DESIGNED ¬
      ¬CAGE." : GOSUB 10500
5565 PRINT
5570 XX$="TO DO THIS, CHOOSE ITS ¬
      ¬LOCATION AS THE" : GOSUB 10500
5573 PRINT
5575 XX$="DROP POINT. THEN SPECIFY A ¬
      ¬RADIUS OF" : GOSUB 10500
5577 PRINT
5580 XX$="ZERO (0). THIS TRIGGERS THE ¬
      ¬TELEPORTER." : GOSUB 10500
5585 PRINT:PRINT
```

```
5587 XX$="YOUR SCORE WILL BE CONSTANTLY ¬
      ¬MONITORED." : GOSUB 1Ø5ØØ
559Ø PRINTRM$;
5595 GOSUB 1Ø1ØØ
5999 RETURN
6ØØØ PRINT"ĥ"; : REM DRAW BOARD
6Ø1Ø FOR Z=1 TO 1Ø
6Ø2Ø :PRINT"W W W W W W W W W W &"
6Ø3Ø :PRINT"                    &"
6Ø4Ø NEXT Z
6Ø5Ø PRINT"r&&MARTIAN&&&HUNT&&&&&"
68ØØ PRINT"h";
681Ø PRINTTAB(23);" USE KEYPAD"
682Ø PRINTTAB(23);"TO MOVE YOUR"
683Ø PRINTTAB(23);"  SHIP  (Q)"
684Ø PRINT
685Ø PRINTTAB(23);"   7  8  9"
686Ø PRINTTAB(23);"    \ ^ / "
687Ø PRINTTAB(23);"     \!/  "
688Ø PRINTTAB(23);"   4^@*@@6"
689Ø PRINTTAB(23);"     /!\  "
69ØØ PRINTTAB(23);"    / ! \ "
691Ø PRINTTAB(23);"   1  2  3"
692Ø PRINT
693Ø PRINTTAB(23);"HIT 5 WHEN YOU"
694Ø PRINTTAB(23);" ARE AT YOUR "
695Ø PRINTTAB(23);"  DROP POINT"
6999 RETURN
7ØØØ PRINT"h";:REM CLEAR RIGHT AREA
7Ø1Ø FORZ=1 TO 23
7Ø2Ø :PRINTTAB(21);LEFT$(ZS$,18)
7Ø3Ø NEXT Z
7Ø99 RETURN
71ØØ PRINT ND;" NET";:IFND<>1THENPRINT"S
      ¬";
711Ø PRINT" DROPPEDh"
7199 RETURN
72ØØ D2=(XØ-X)*(XØ-X)+(YØ-Y)*(YØ-Y) :
      ¬ REM DISTANCE VALUE FROM DROP TO ¬
      ¬MARTIAN
721Ø R2=R*R : REM DISTANCE VALUE OF ¬
      ¬RADIUS OF NET
```

```
 7220 NT$="MISSED":POKEML,XA+48:IF ¬
       ¬R2=>D2 THEN NT$="r̲HITr̂" : POKE ML,
       ¬ XA+48+128
 7299 RETURN
 7300 PRINTRM$;"TELEPORTER ";NT$
 7310 IFD2=ØTHEN74ØØ
 7399 RETURN
 74ØØ PRINT"h̲"; : REM WINNER*****
 741Ø FORZ=1TO1Ø
 742Ø :PRINTTAB(22);"**********"
 743Ø :PRINTTAB(23);"r̲YOU WON"
 744Ø NEXTZ
 745Ø PRINTTAB(22);"**********"
 746Ø PRINT"↓↓r̲DO YOU WANT TO PLAY ¬
       ¬AGAIN?"
 747Ø GOSUB1Ø13Ø
 748Ø IFXA$="Y"THENRUN
 749Ø IFXA$="N"THENPRINT"↑↑↑↑↑↑";:END
 7495 GOTO747Ø
 9999 END
 1Ø1ØØ IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
       ¬CONTINUE r̂" : REM GET 1 CHARACTER
 1Ø12Ø IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
 1Ø13Ø GETXA$:IFXA$>""THEN1Ø13Ø:REM ¬
       ¬CLEAR BUFFER
 1Ø14Ø GETXA$:IFXA$=""THEN1Ø14Ø
 1Ø15Ø XA=VAL(XA$)
 1Ø199 XX$="":RETURN
 1Ø5ØØ XL=LEN(XX$) : IF XL=Ø THEN 1Ø599 :
       ¬ REM ERROR - RETURN - SLOW PRINTER
 1Ø52Ø FOR XX=1 TO XL
 1Ø53Ø :PRINT MID$(XX$,XX,1);
 1Ø54Ø :XT=TI : REM SET TIMER
 1Ø55Ø :IF XT+5*SP>TI THEN 1Ø55Ø :
       ¬ REM THE 5 CAN BE VARIED FOR DIF ¬
       ¬LENGTH PAUSE
 1Ø56Ø NEXT XX
 1Ø57Ø PRINT:REM CARRIAGE RETURN
 1Ø599 XL=Ø:XT=Ø:XX=Ø:XX$="":RETURN
READY.
```

The Code Game

(By Permission of Peter Weiler)

This fascinating exercise in logic, deduction, and espionage pits your spying skills against your PET. You can alternate the roles of code maker and code breaker to become a well-rounded secret agent.

As *code maker*, you invent a secret code and provide clues. As *code breaker*, you make use of these clues to decipher or "break" the code. The *code* itself is a row of symbols. To break the code, you must guess the position of each symbol in the row.

You may choose what symbols the code maker may use and how many places there are in a row. A beginner may want to use 3 places and 4 symbols; 4 places and 6 symbols are the most typical choice. A veritable Mastermind^{TM} (Mastermind is a registered trademark of Invicta Plastics Ltd.) can play with as many as 7 places in a row and up to 9 symbols.

Here's a sample of the code-breaking process:

	P	S
* $ & *	1	0
$ @ & @	0	1
@ # # *	1	3
* # @ #	4	0

Here's what happened. As the code breaker makes guesses, the code maker provides two clues. These are the number of *place* matches (P) and the number of *symbol* matches (S). The number of place matches (*P*) is the number of places in which the symbol appears in both the code and your guess. The number of symbol matches (*S*) is the number of times that the code and your guess have matching symbols in *different* places.

You have a maximum number of 15 (fifteen) guesses before you must concede defeat to the Other Side. Of course, you want to break the code with as few tries as possible.

Before you begin your adventure in espionage, Spymaster Weiler advises you to study the sample game and think of *The Rule of Counting Matches*. The following paragraph provides an example.

The * at the beginning of the code cannot form a symbol-match with the * at the end of the first guess, because the * in the code is *part of a place match* with the first symbol of the guess. In the second guess, only one of the two @s can be matched because there is only one @ in the secret code. However, both #s in the third guess are part of matches because there are *two #s* in the secret code.

In this sample, the code breaker chooses his guesses by examining the possible codes until he finds one that is consistent with the clues he's received. You don't have to examine *all* possible codes. If you find that the first few symbols of a code are inconsistent with the clues, you can skip over all codes that begin with these symbols in one step. Got that, Agent 007?

Classified Information: Owners of *8K PET Models* should eliminate the REM statements from the program, and any extra spaces in the lines. This program will just fit into your PET.

Comments from the Research Department:

Cryptography: sending secret messages (code-making)

Cryptanalysis: deciphering secret messages (code-breaking)

Steganography: methods of concealing secret messages (such as microdots)

Codes operate on complete words and phrases. Ciphers operate on single letters.

Plain Text	*Codenumber*	*Codeword*
a, an	9213	HXOF

"Cryptography and cryptanalysis are sometimes called reciprocal sciences . . . what one does the other undoes . . . Cryptography is theoretical and abstract. Cryptanalysis is empirical and concrete.

"It would not be an exaggeration to state that abstract cryptography is identical with abstract mathematics . . . The transformations are generally of a simple mathematical nature e.g. permutation in the set of primary elements (the alphabet); coordinate transformations, and so on."

"Different ciphers like different geometries, yield results that are different but equally valid."

David Kahn, *The Codebreakers*, New York, 1967; and Bruce Norman, *The Secret War*, Washington D.C., 1973.

"Cryptanalysis is like the physical sciences—it rests, not upon the unchanging verities of mathematical logic, but upon observable facts."

The cryptanalyst uses the same methods as the physical scientist: experimentation, measurement, analysis, hypothesis, prediction, verification.

Level C: This game should occupy you for *hours* before you send in your application to John Le Carré.

```
Ø REM*** WORKS ON ORIGINAL PET 2ØØ1-8,
      ¬ NEW PET/CBM, BASIC 4.Ø, & CBM ¬
      ¬8Ø32 & 8Ø16
1 REM*** THE CODE GAME (C) 198Ø P WEILER
2 REM*** TO FIT INTO 8K DO NOT TYPE IN ¬
      ¬ANY EXTRA SPACES IN THE LINES AND
3 REM*** DO NOT ENTER ANY REMS
8 REM*** Ø4-15-8Ø
9 REM*** USES MAIN SUBROUTINES 1Ø1ØØ & ¬
      ¬1Ø2ØØ
1Ø PRINT"ĥ↓↓↓↓↓↓          THE CODE ¬
      ¬GAME↓↓↓"
2Ø PRINT"        BY PETER R. WEILER↓":
      ¬REM MADISON, WI 537Ø6
3Ø POKE59468,12
5Ø ZL$="←←←←←←←←←←←"
1ØØ REM CHOOSE PLAY OPTION
12Ø PRINT"↓YOU MAY CHOOSE TO BE":
      ¬PRINT"↓   1. THE CODE BREAKER"
13Ø PRINT"    2. THE CODE MAKER":
      ¬PRINT"   3. BOTH ALTERNATELY↓"
14Ø XX$="YOUR CHOICE (TYPE 1, 2 OR 3)?":
      ¬GOSUB1Ø1ØØ:OP=XA:PRINTOP
16Ø PRINT"ĥ";:IFOP<1OROP>3THEN12Ø
3ØØ REM INITIALIZATIONS
32Ø XX$="↓↓↓HOW MANY PLACES IN A CODE?":
      ¬GOSUB1Ø1ØØ:NP=XA:PRINTNP
33Ø IFNP<1THENPRINT"ĥ":GOTO32Ø
34Ø IF NP>7 THEN PRINT"ĥPLEASE, NO MORE ¬
      ¬THAN 7":GOTO 32Ø
```

```
360 XX$="↓↓↓HOW MANY DIFFERENT SYMBOLS?"
      ¬:GOSUB1Ø1ØØ:NS=XA:PRINTNS
370 IFNS<2THENPRINT"ĥ":GOTO36Ø
38Ø IF NS>9 THEN PRINT"ĥPLEASE, NO MORE ¬
      ¬THAN 9":GOTO 36Ø
4ØØ MR=15:REM SET MAX NUMBER OF ROWS ¬
      ¬(GUESSES)
42Ø DIM S$(NS),RW%(NP,MR),PM%(MR),
      ¬SM%(MR),PS%(MR),ZC%(NS)
44Ø IF OP<>2 THEN DIM SC%(NP),ZG%(NS)
46Ø IF OP<>1 THEN DIM TC%(NP),TB%(MR),
      ¬TA%(MR),S%(NS),ZR%(NS,MR)
52Ø GOSUB 822Ø:REM GOTO SELECT SYMBOLS ¬
      ¬SUBR.
6ØØ REM SET CODE BREAKER FLAG
62Ø CB$="YOU":IF OP=2 THEN CB$="ME"
64Ø IF OP<>3 GOTO 72Ø
66Ø XX$="ĥ↓↓DO YOU WANT TO BE CODE ¬
      ¬BREAKER FIRST?":GOSUB1Ø1ØØ:A$=XA$
665 PRINT"ĥ"
67Ø IFA$<>"N" AND A$<>"Y" THEN 66Ø
68Ø IF A$<>"Y" THEN CB$="ME"
7ØØ REM INITIALIZE SCORES,PENALTY-FLAG,
      ¬QQ FLAG
72Ø YG=Ø:YS=Ø:MG=Ø:MS=Ø:PN$="NONE":QQ=Ø
1ØØØ REM MAIN LOOP
1Ø2Ø IF CB$="YOU" THEN GOSUB 2Ø2Ø:
      ¬GOTO 1Ø6Ø
1Ø4Ø IF CB$="ME" THEN GOSUB 5Ø2Ø
1Ø6Ø IF PN$<>"NONE" GOTO 122Ø
1Ø8Ø REM UPDATE SCORES
11ØØ IF CB$="YOU" THEN YS=YS+NR:YG=YG+1
112Ø IF CB$="ME" THEN MS=MS+NR:MG=MG+1
114Ø IF OP<>3 GOTO 132Ø
116Ø IF CB$="YOU" THEN CB$="ME":
      ¬GOTO 132Ø
118Ø CB$="YOU":GOTO 132Ø
12ØØ REM HANDLE PENALTY
122Ø PRINT"↓THIS GAME WILL NOT COUNT,
      ¬ EXCEPT THAT"
124Ø IF PN$="YOU" THEN PRINT"YOU ARE ";:
      ¬YS=YS+3
```

```
126Ø IF PN$="ME" THEN PRINT"I AM ";:
       ¬MS=MS+3
128Ø PRINT"ASSESSED A 3 GUESS PENALTY.":
       ¬PN$="NONE"
132Ø IF YG+MG<=Ø THEN14ØØ
133Ø PRINT"↓↓↓","SCOREBOARD↓"
134Ø PRINT" ","# OF","# OF","AVE # OF":
       ¬PRINT"PLAYER","GAMES","GUESSES",
       ¬"GUESSES"
136Ø IF YG>Ø THEN PRINT"↓YOU",YG,YS,
       ¬INT(1ØØ*YS/YG)/1ØØ
138Ø IF MG>Ø THEN PRINT"↓ME",MG,MS,
       ¬INT(1ØØ*MS/MG)/1ØØ
139Ø PRINT:PRINT
14ØØ PRINT:PRINT
142Ø XX$="DO YOU WANT TO REVIEW THIS ¬
       ¬LAST GAME?":GOSUB1Ø1ØØ:PRINTXA$
144Ø IFXA$="Y" THEN GOSUB7Ø2Ø
146Ø XX$="↓DO YOU WANT TO PLAY ANOTHER ¬
       ¬GAME?":GOSUB1Ø1ØØ:PRINTXA$
148Ø IFXA$="Y" GOTO 1Ø2Ø
15ØØ PRINT"↓GOODBYE":END
2ØØØ REM CODE MAKER SUBR
2Ø2Ø NR=Ø:REM INITIALIZE GAME
2Ø4Ø FOR S=1TO NS:ZG%(S)=Ø:ZC%(S)=Ø:
       ¬NEXTS
2Ø6Ø FOR R=1TO MR:PM%(R)=Ø:SM%(R)=Ø:
       ¬PS%(R)=Ø
2Ø8Ø FOR P=1TO NP:RW%(P,R)=Ø:NEXTP:NEXTR
21ØØ FOR P=1 TO NP:SC%(P)=1+INT(NS*RND(1
       ¬))
212Ø ZC%(SC%(P))=ZC%(SC%(P))+1:NEXTP
213Ø PRINT"ĥ↓↓↓WHEN AND IF YOU WANT TO ¬
       ¬QUIT GUESSING"
214Ø PRINT"TYPE 'Q' OR 'QUIT'. TYPE 'D' ¬
       ¬OR"
215Ø PRINT"'DISPLAY' TO DISPLAY BOARD ¬
       ¬AGAIN.↓"
216Ø GOSUB 852Ø
218Ø PRINT"↓↓I HAVE SELECTED MY SECRET":
       ¬PRINT"CODE. WHAT IS YOUR FIRST"
22ØØ REM INPUT GUESS ROUTINE
```

```
2220 XQ$="GUESS":GOSUB10200:G$=XA$:
       ¬IFG$="?"THENPRINT"↑";:XP$="?        ¬
       ¬":GOTO2220
2240 IF G$="D" OR G$="DISPLAY" THEN ¬
       ¬GOSUB7020:GOTO 2220
2280 IF G$="Q" OR G$="QUIT" THEN ¬
       ¬PRINT"ĥ↓↓":GOSUB 7920:PN$="YOU":
       ¬RETURN
2320 R=NR+1:REM NEXT CRACK THE GUESS
2340 I=0:FOR P=1TO NP
2360 I=I+1:IF I>LEN(G$) THEN PRINT"TOO ¬
       ¬FEW SYMBOLS. TRY AGAIN.":GOTO 2220
2380 A$=MID$(G$,I,1):IF A$=" " OR ¬
       ¬ASC(A$)=160 GOTO 2360
2400 FOR S=1 TO NS:IF A$=S$(S) THEN ¬
       ¬RW%(P,R)=S:GOTO 2500
2420 NEXTS:PRINTA$;" WILL NOT MATCH ANY ¬
       ¬OF THE GAME"
2440 PRINT"SYMBOLS. DO YOU WANT TO ¬
       ¬CHANGE"
2460 XQ$="YOUR GUESS":GOSUB10200:A$=XA$:
       ¬IF LEFT$(A$,1)="Y" THEN 2220
2480 S$(0)=MID$(G$,I,1)
2500 NEXTP
2520 IF I<LEN(G$) THEN PRINT"TOO MANY ¬
       ¬SYMBOLS. TRY AGAIN.":GOTO 2220
2620 NR=R:REM COMPUTE NUMBERS OF MATCHES
2640 FOR S=1TO NS:ZG%(S)=0:NEXTS
2660 FOR P=1TO NP:S=RW%(P,NR):IF S<1 ¬
       ¬THEN 2720
2680 IF S=SC%(P) THEN PM%(NR)=PM%(NR)+1
2700 ZG%(S)=ZG%(S)+1:IF ZG%(S)<=ZC%(S) ¬
       ¬THEN  PS%(NR)=PS%(NR)+1
2720 NEXT P:SM%(NR)=PS%(NR)-PM%(NR)
2740 IF PM%(NR)<NP THEN GOSUB 7020:
       ¬REM GO DISPLAY BOARD
2760 IF PM%(NR)=NP THEN PRINT"ĥ↓↓↓YOU ¬
       ¬BROKE MY CODE IN";NR;"GUESSES.":
       ¬RETURN
2780 IF NR<MR GOTO 2220
2820 PRINT"ĥ↓↓↓I CAN'T HANDLE MORE ROWS,
       ¬ SO YOU"
2840 PRINT"SCORE JUST";MR;"GUESSES.":
       ¬GOSUB 7920:RETURN
```

```
5ØØØ REM CODE BREAKER SUBR
5Ø2Ø PRINT"ĥ":GOSUB 852Ø
5Ø4Ø XX$="↓↓↓HAVE YOU SELECTED A CODE?":
      ¬GOSUB1Ø1ØØ
5Ø6Ø IFXA$<>"Y"THEN 5Ø2Ø
512Ø REM INITIALIZE
514Ø FOR R=1TO MR:PM%(R)=Ø:SM%(R)=Ø:
      ¬PS%(R)=Ø:NEXTR
516Ø FOR S=1TO NS:ZC%(S)=Ø:ZR%(S,1)=Ø:
      ¬NEXTS
518Ø FOR P=1TO NP:TC%(P)=Ø:NEXTP
52ØØ FOR S=1TO NS:REM REARRANGE S$ TO ¬
      ¬VARY MY PLAY
522Ø A$=S$(S):I=1+INT(NS*RND(1)):
      ¬S$(S)=S$(I):S$(I)=A$:NEXTS
524Ø FOR S=1TO NS:I=ASC(S$(S)):S%(S)=(63
      ¬ANDI)+(64ANDI/2):NEXTS:I=Ø
526Ø FOR P=1TO NP:I=I+1:RW%(P,1)=I:
      ¬ZR%(I,1)=ZR%(I,1)+1:IF I=NS THEN ¬
      ¬I=Ø
528Ø NEXTP:NR=1:GOTO 532Ø
53ØØ NR=NR+1:FOR P=1TO NP:RW%(P,
      ¬NR)=TC%(P):NEXTP
531Ø FOR S=1TO NS:ZR%(S,NR)=ZC%(S):
      ¬NEXTS:WH%(NR)=Ø
532Ø QQ=1:GOSUB 7Ø2Ø:QQ=Ø
534Ø XX$="HOW MANY PLACE MATCHES?":
      ¬GOSUB1Ø1ØØ:PM%(NR)=XA:PRINTXA
535Ø IF PM%(NR)=NP THEN PRINT"ĥ↓↓↓I ¬
      ¬FOUND IT IN";NR;"GUESSES.":RETURN
536Ø XX$="HOW MANY SYMBOL MATCHES?":
      ¬GOSUB1Ø1ØØ:SM%(NR)=XA:PRINTXA
538Ø PS%(NR)=PM%(NR)+SM%(NR):IF ¬
      ¬PS%(NR)>NP THEN PRINT"TOO MANY":
      ¬GOTO 534Ø
546Ø IF NR=MR THEN PRINT"ĥ↓↓↓I QUIT. ¬
      ¬TOO MANY ROWS.":PN$="ME":RETURN
548Ø IF NR=1 THEN TA%(1)=Ø:TB%(1)=Ø:P=1:
      ¬GOTO 562Ø
552Ø FOR P=1TO NP:POKE (33Ø86+8Ø*P),
      ¬S%(TC%(P)):NEXTP
554Ø TA%(NR)=NP:TB%(NR)=NP:R=NR:P=NP
556Ø GOTO582Ø
```

```
5620 TC%(P)=TC%(P)+1:ZC%(TC%(P))=ZC%(TC%
      ¬(P))+1
5640 FOR R=1TO NR
5660 IF TC%(P)=RW%(P,R) THEN TB%(R)=TB%(
      ¬R)+1
5680 IF ZC%(TC%(P))<=ZR%(TC%(P),
      ¬R) THEN TA%(R)=TA%(R)+1
5690 POKE (33Ø86+8Ø*P),S%(TC%(P))
57ØØ IF TB%(R)>PM%(R) GOTO582Ø
571Ø IF TA%(R)>PS%(R) GOTO582Ø
572Ø IF TB%(R)+NP-P<PM%(R) GOTO582Ø
574Ø IF TA%(R)+NP-P<PS%(R) GOTO582Ø
576Ø NEXTR:R=NR:IF P=NP THEN 53ØØ
578Ø P=P+1:GOTO 562Ø
58ØØ P=P+1:GOTO 562Ø
582Ø LR=R:FOR R=1TO LR
584Ø IF TC%(P)=RW%(P,R) THEN TB%(R)=TB%(
      ¬R)-1
586Ø IF ZC%(TC%(P))<=ZR%(TC%(P),
      ¬R) THEN TA%(R)=TA%(R)-1
588Ø NEXTR:ZC%(TC%(P))=ZC%(TC%(P))-1
59ØØ IF TC%(P)<NS THEN 562Ø
591Ø POKE (33Ø86+8Ø*P),32
592Ø TC%(P)=Ø:P=P-1:IF P>Ø THEN R=NR:
      ¬GOTO 582Ø
594Ø PRINT"ĥ↓↓↓NO CODE IS CONSISTENT ¬
      ¬WITH THE":PRINT"INFORMATION YOU ¬
      ¬GAVE ME."
596Ø PN$="YOU":RETURN
7ØØØ REM BOARD DISPLAY SUBR.
7Ø2Ø PRINT"ĥ↓↓";TAB(13);"THE CODE GAME":
      ¬PRINT
7Ø4Ø PRINTTAB(2Ø-NS);:FOR S=1TO NS:
      ¬PRINTS$(S);" ";:NEXTS:PRINT
7Ø6Ø PRINTTAB(14-NP);"Ø@";:FOR P=1TO NP:
      ¬PRINT"@@";:NEXTP:PRINT"@@2@@@@@@."
7Ø8Ø PRINTTAB(14-NP);"⊥ ";SPC(2*NP+1);" ¬
      ¬⊥ P  S ⊥":IF NR<6 THEN GOSUB 78ØØ
71ØØ FOR R=1TO NR:PRINTTAB(14-NP);"⊥  ";
712Ø FOR P=1TO NP:PRINTS$(RW%(P,
      ¬R));" ";:NEXTP
714Ø PRINT" ⊥";PM%(R);SM%(R);
```

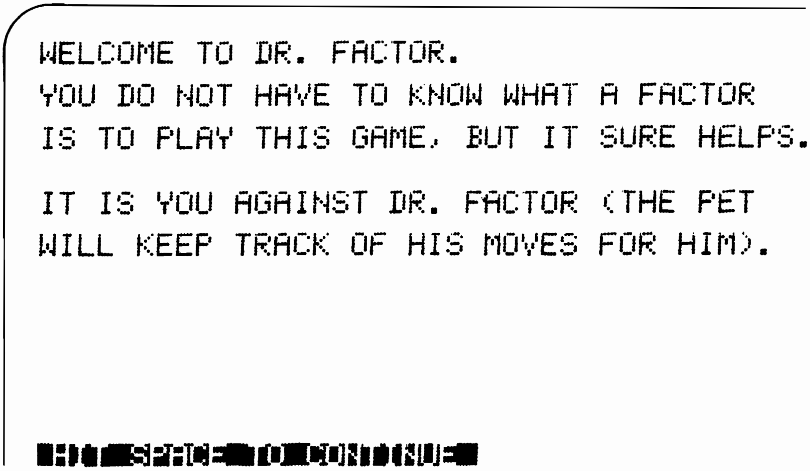
```
7160 IF R=NR THEN IF QQ=1 THEN PRINT"←←←
      ¬←←?  ? ";
7180 PRINT"1̲":IF NR<11 THEN GOSUB 7800:
      ¬IF NR<6 THEN GOSUB 7800
7200 NEXTR:PRINTTAB(14-NP);"-̲@̲";:
      ¬FOR P=1TO NP:PRINT"@̲@̲";:NEXTP
7220 PRINT"@̲@̲1̲@̲@̲@̲@̲@̲@̲=̲":RETURN
7800 PRINTTAB(14-NP);"1̲ ";SPC(2*NP+1);" ¬
      ¬1̲       1̲":RETURN
7900 REM REVEAL MY CODE SUBR
7920 PRINT:PRINT"MY CODE IS";:FOR P=1TO ¬
      ¬NP
7940 PRINT" ";S$(SC%(P));:NEXTP:PRINT:
      ¬RETURN
8200 REM SELECT SYMBOLS SUBR
8220 PRINT"↓↓↓DO YOU WANT:↓":PRINT"   ¬
      ¬1. PET GRAPHIC SYMBOLS"
8240 PRINT"   2. THE DIGITS 1 TO";NS:
      ¬PRINT"   3. TO SELECT YOUR OWN ¬
      ¬SYMBOLS↓"
8260 XX$="TYPE 1, 2 OR 3?":GOSUB10100:
      ¬I=XA:PRINTI
8270 IFI<1 OR I>3 THEN PRINT"ĥ":GOTO8220
8280 IF I=1 THEN FOR S=1TO NS:READ ¬
      ¬S$(S):NEXTS:RETURN
8300 IF I=2 THEN FOR S=1TO NS:S$(S)=RIGH
      ¬T$(STR$(S),1):NEXTS:RETURN
8320 IF I<>3 THEN 8260
8340 PRINT:FOR S=1TO NS
8360 PRINT"SYMBOL #";S;:GOSUB10200:
      ¬S$(S)=XA$:IFXA$="?̲"THENPRINT"↑";:
      ¬GOTO8360
8380 IF LEN(S$(S))>1 THEN PRINT"ONLY ¬
      ¬ONE CHAR. PER SYMBOL, PLEASE":
      ¬GOTO8360
8400 FOR I=1TO S-1:IF S=1 GOTO8440
8420 IF S$(S)=S$(I) THEN PRINT"NO ¬
      ¬REPEATS PLEASE":GOTO 8360
8440 NEXTI:NEXTS:RETURN
8460 DATA "A̲","S̲","Z̲","X̲","Q̲","W̲","^̲",
      ¬"?̲","&̲"
8520 PRINT"↓THE SYMBOLS ARE↓":REM ¬
      ¬DISPLAY SYMBOLS SUBR
```

```
 854Ø PRINTTAB(2Ø-NS);:FOR S=1TO NS:
       ¬PRINTS$(S);" ";:NEXTS:PRINT:PRINT:
       ¬RETURN
 1ØØØØ REM INPUT ROUTINES
 1Ø1ØØ PRINTXX$;
 1Ø13Ø GETXA$:IFXA$>""THEN1Ø13Ø
 1Ø14Ø GETXA$:IFXA$=""THEN1Ø14Ø
 1Ø15Ø XA=VAL(XA$)
 1Ø199 XX$="":RETURN
 1Ø2ØØ IFXP$=""THENXP$="?"
 1Ø22Ø GETXA$:IFXA$<>""THEN1Ø22Ø
 1Ø25Ø XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
       ¬4)
 1Ø26Ø PRINTXQ$;XB$;:INPUTXA$:XA=VAL(XA$)
 1Ø299 XP$="":XQ$="":RETURN
READY.
```

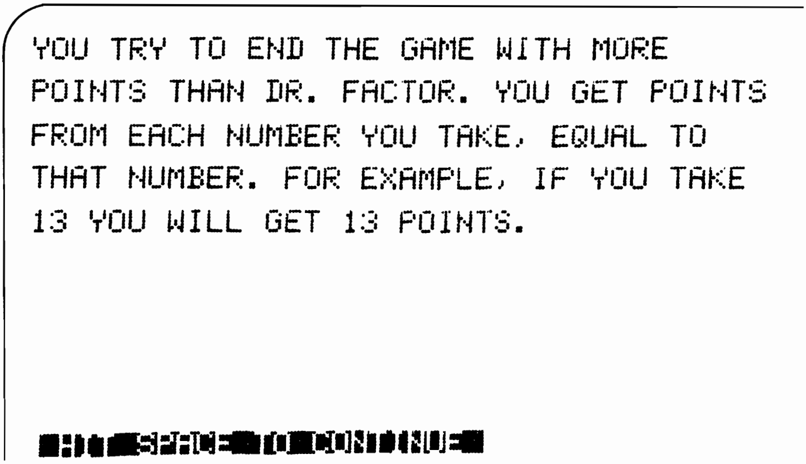
Dr. Factor

by Len Lindsay

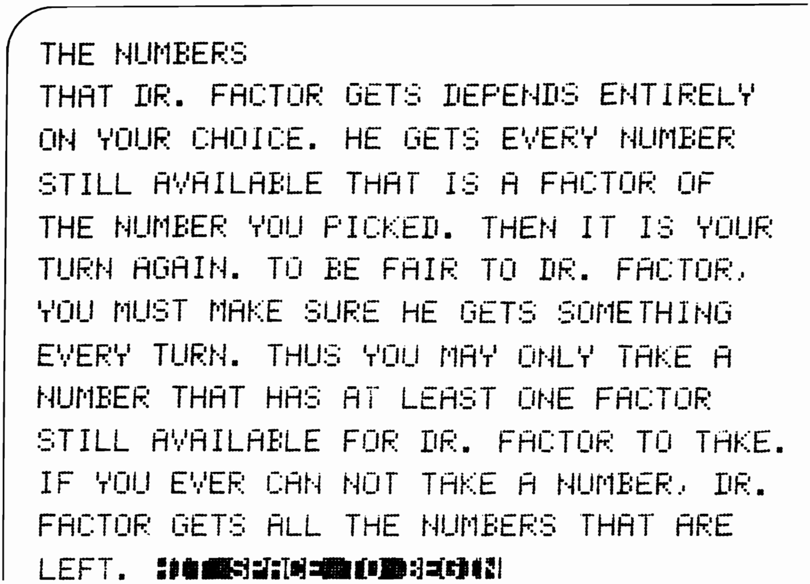
Challenging *Dr. Factor* successfully depends on your knowledge of *factors* and *primes* PLUS your deductive-reasoning strategies. (Time out while you look up factors and primes!) You can choose how large your playing range will be (up to 90). The larger your range, the more important strategy becomes. Here's how to play *Dr. Factor*:



```
WELCOME TO DR. FACTOR.
YOU DO NOT HAVE TO KNOW WHAT A FACTOR
IS TO PLAY THIS GAME, BUT IT SURE HELPS.

IT IS YOU AGAINST DR. FACTOR (THE PET
WILL KEEP TRACK OF HIS MOVES FOR HIM).




 HIT SPACE TO CONTINUE
```

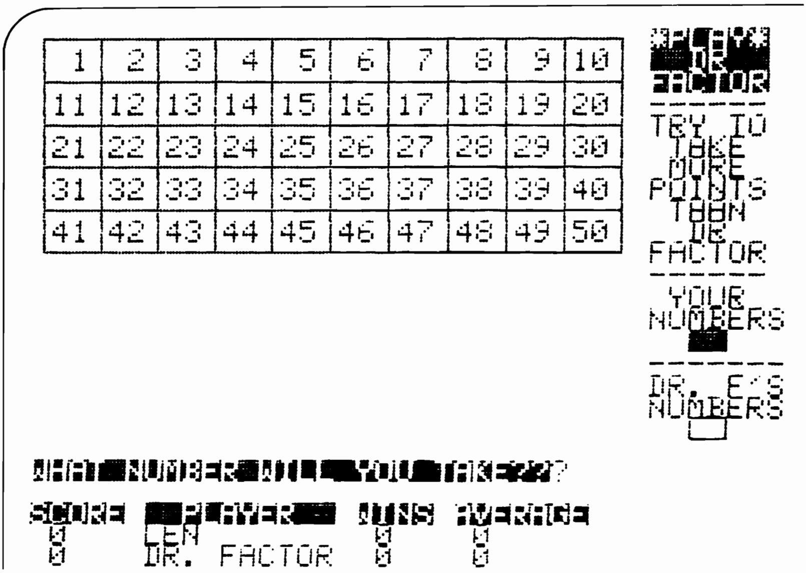


```
YOU TRY TO END THE GAME WITH MORE
POINTS THAN DR. FACTOR. YOU GET POINTS
FROM EACH NUMBER YOU TAKE, EQUAL TO
THAT NUMBER. FOR EXAMPLE, IF YOU TAKE
13 YOU WILL GET 13 POINTS.




 HIT SPACE TO CONTINUE
```



```
THE NUMBERS
THAT DR. FACTOR GETS DEPENDS ENTIRELY
ON YOUR CHOICE. HE GETS EVERY NUMBER
STILL AVAILABLE THAT IS A FACTOR OF
THE NUMBER YOU PICKED. THEN IT IS YOUR
TURN AGAIN. TO BE FAIR TO DR. FACTOR,
YOU MUST MAKE SURE HE GETS SOMETHING
EVERY TURN. THUS YOU MAY ONLY TAKE A
NUMBER THAT HAS AT LEAST ONE FACTOR
STILL AVAILABLE FOR DR. FACTOR TO TAKE.
IF YOU EVER CAN NOT TAKE A NUMBER, DR.
FACTOR GETS ALL THE NUMBERS THAT ARE
LEFT. [illegible]
```

As an example, we're choosing a range of 50. A chart of numbers appears on your PET's screen:

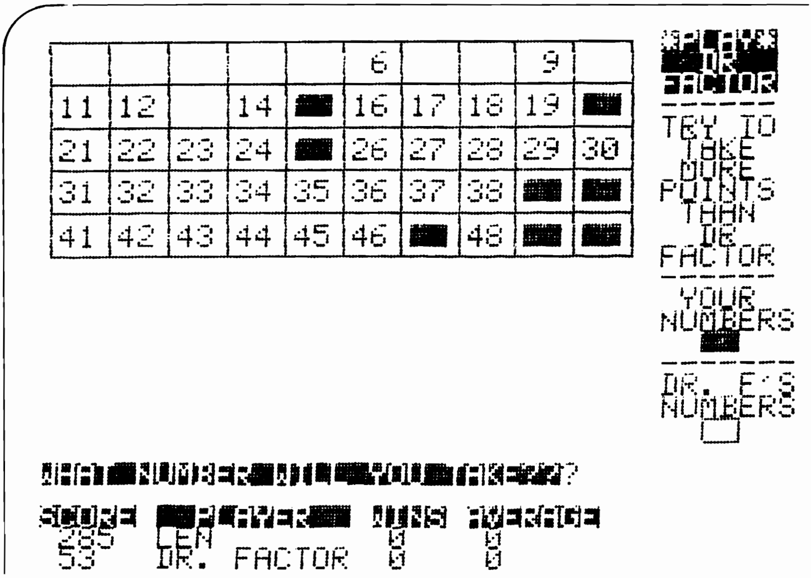


1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

```
[illegible]
DR
FACTOR
-------
TRY TO
TAKE
MORE
POINTS
THAN
DR
FACTOR
-------
YOUR
NUMBERS
-------
DR. F'S
NUMBERS
```

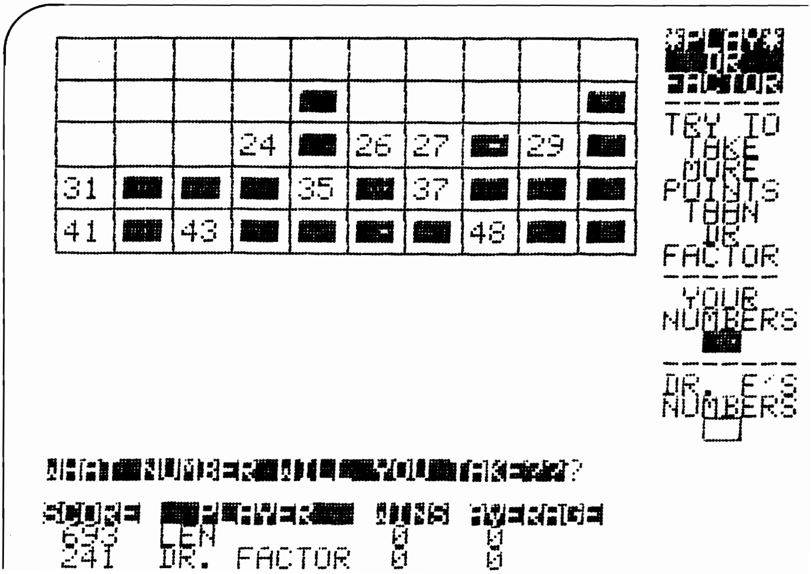
```
WHAT NUMBER WILL YOU TAKE???

SCORE   PLAYER       TURNS  AVERAGE
 0      LEN           0      0
 0      DR. FACTOR    0      0
```

You go first, by picking any available number. That number is added to your score. Dr. Factor gets every number that is a *factor* of your choice. (If the number has no factors, PET won't let you choose it—unfair to Dr. Factor.) For instance, if you pick 26, Dr. Factor gets all the factors of 26 (1, 2, and 13). You and Dr. Factor alternate turns until there are no more factorable numbers left for you to take. Then, Dr. Factor adds all the numbers left over to his score. Watch out—he can really clean up here!



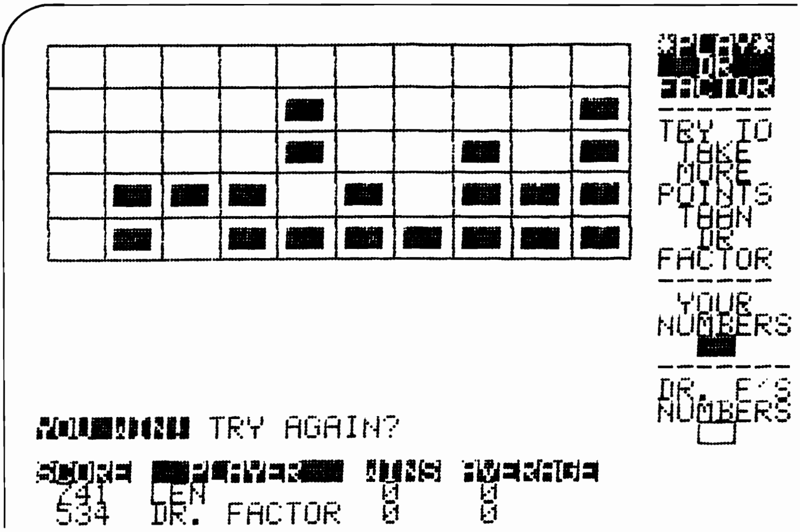
					6			9	
11	12		14	■	16	17	18	19	■
21	22	23	24	■	26	27	28	29	30
31	32	33	34	35	36	37	38	■	■
41	42	43	44	45	46	■	48	■	■

```
[illegible]
FACTOR
TRY TO
TAKE
MORE
POINTS
THAN
DR
FACTOR

YOUR
NUMBERS

DR. F'S
NUMBERS

WHAT NUMBER DO YOU CHOOSE?
SCORE   PLAYER   WINS   AVERAGE
 285    LEN       0      0
 53     DR. FACTOR 0     0
```



				■					■
			24	■	26	27	■	29	■
31	■	■	■	35	■	37	■	■	■
41	■	43	■	■	■	■	48	■	■

```
[illegible]
FACTOR
TRY TO
TAKE
MORE
POINTS
THAN
DR
FACTOR

YOUR
NUMBERS

DR. F'S
NUMBERS

WHAT NUMBER DO YOU CHOOSE?
SCORE   PLAYER   WINS   AVERAGE
 693    LEN       0      0
 241    DR. FACTOR 0     0
```



```
TRY TO
TAKE
MORE
POINTS
THAN
DR.
FACTOR

YOUR
NUMBERS

DR. F'S
NUMBERS

[illegible] TRY AGAIN?
[illegible]
 241  LEN
 534  DR. FACTOR  0    0
```

The winner is the one with the highest score. This is a game of pure skill! You can't blame Dr. Factor, the man in the moon, or anyone else. When you've figured out how to get high scores, play to see how low a score you can get.

If you're either learning or teaching *factoring* and *prime numbers*, run do not walk to the nearest PET!

Although it's highly appropriate for owners of *Business Keyboards* to be playing a game that involves factors and prime numbers, you will again have problems with the graphics. Here are some suggestions. Shift ? represents a checkerboard character. Change it to Shift Z, and change this *every time* it appears in the program. Lines 6000-6199 draw the board. Make these changes if you have the business keyboard:

6Ø1Ø PRINT
6Ø2Ø change the two SHIFT & at the end of the line to SHIFT V.
6Ø4Ø ::PRINT "!"; NS$; use an exclamation point as substitute
6Ø6Ø :PRINT "!"
6Ø7Ø :PRINT "+" use the plus sign
6Ø9Ø ::PRINT "--+"; use two hyphens and a plus sign
611Ø :PRINT
Delete 613Ø.

Level C: No one ever told me math could be so much fun!

```
Ø REM*** WORKS ON ORIGINAL PET 2ØØ1-8,
      ¬ NEW PET/CBM, BASIC 4.Ø, & CBM ¬
      ¬8Ø32 & 8Ø16
1 REM***DR. FACTOR***
2 REM***PCC IDEA
3 REM***ORIGINAL PROGRAM
4 REM***(C) 198Ø
5 REM***BY LEN LINDSAY
6 REM***Ø1-22-8Ø
7 REM***USES MAIN SUBROUTINES 1Ø1ØØ,
      ¬ 1Ø2ØØ, 1Ø4ØØ
1Ø POKE59468,12:REM GRAPHIC MODE
15 XQ=RND(-TI) : XQ=Ø : REM SEED RND
2Ø PRINT"ĥ"; : REM CLEAR SCREEN
3Ø DIMN(9Ø):REM ARRAY FOR NUMBERS IN ¬
      ¬LIST
4Ø DEF FNR(N)=INT(RND(1)*N+1) : REM RND#
5Ø REM
51 ZZ$="
      ¬" : REM 4Ø DELETE
52 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":REM 21 ¬
      ¬DOWN
56 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→→" : REM 4Ø RIGHT
58 ZL$="←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←
      ¬←←←←←←←←←" : REM 4Ø LEFT
6Ø RM$="h̲"+ZD$+ZZ$:REM TO REMARK LINE
62 SC$="h̲"+ZD$+"↓↓":REM TO SCORE LINE
1ØØ PRINTRM$:XQ$="HI! WHAT IS YOUR ¬
      ¬NAME":GOSUB1Ø2ØØ
11Ø NM$=XA$:IFNM$="?̲"THEN1ØØ
12Ø NM$=LEFT$(NM$,1Ø):REM CUT NAME TO ¬
      ¬1Ø CHARACTERS
13Ø PRINTRM$:PRINT"DO YOU WANT TO SEE ¬
      ¬THE INSTRUCTIONS?";:GOSUB1Ø13Ø
14Ø IFXA$="N"THEN2ØØ
15Ø IFXA$="Y"THENGOSUB5ØØØ:GOTO2ØØ
16Ø GOTO13Ø:REM ERROR
2ØØ PRINT"ĥ";RM$:PRINT"WHAT SHOULD THE ¬
      ¬HIGHEST NUMBER BE"
2Ø1 XQ$="(5-9Ø)":GOSUB1Ø2ØØ
2Ø5 IFXA$="?̲"THEN2ØØ:REM ERROR
21Ø HN=XA:IFHN<5ORHN>9ØTHEN2ØØ
215 FORZ=1TO9Ø:N(Z)=Ø:NEXT:REM CLEAR ¬
      ¬ARRAY
```

```
216 FORZ=1TOHN:N(Z)=1:NEXT:REM FILL ¬
      ¬ARRAY
22Ø GOSUB6ØØØ :REM PRINT BOARD
23Ø GOSUB62ØØ : REM PRINT SIDELINES
24Ø GOSUB64ØØ:REM PRINT BOTTOM
3ØØ PRINTRM$;"r̲WHAT NUMBER WILL YOU ¬
      ¬TAKE??r̂?";
31Ø ND=Ø : REM INIT NUMBER DIGITS
32Ø GOSUB1Ø13Ø:REM GET
33Ø IFND=ØTHENND=1:GOTO36Ø
34Ø IFXA$=CHR$(13)THEN4ØØ:REM CARRIAGE ¬
      ¬RETURN SO 1 DIGIT NUMBER
345 IFXA=ØANDXA$<>"Ø"THEN3ØØ:REM ERROR
35Ø N=N*1Ø+XA:GOTO4ØØ
36Ø IFXA=ØTHEN31Ø
37Ø N=XA
38Ø PRINTN;
39Ø GOTO32Ø:REM GET NEXT DIGIT
4ØØ IFN>HNTHENPRINTRM$;"NUMBER IS TOO ¬
      ¬BIG, TRY ANOTHER ";:GOTO31Ø
41Ø IFN(N)=ØTHENPRINTRM$;"THAT NUMBER ¬
      ¬IS TAKEN, TRY ANOTHER ";:GOTO31Ø
42Ø NN=N:REM NUMBER PICKED IS NN
425 IFNN=1THENPRINTRM$;"YOU CAN'T TAKE ¬
      ¬1. TRY ANOTHER NUMBER";:GOTO31Ø
43Ø PRINTRM$;"YOU TAKE";NN;"-LET ME ¬
      ¬CHECK ITS FACTORS"
44Ø GOSUB75ØØ:REM REVERSE FIELD THE ¬
      ¬NUMBER
45Ø GOSUB1Ø4ØØ:REM PAUSE
46Ø GOSUB72ØØ:REM CHECK FACTORS
47Ø IFFF=ØTHENGOSUB77ØØ:GOTO31Ø
48Ø GOSUB64ØØ:REM PRINT SCORE
49Ø N=NN:GOSUB75ØØ:PRINT"  ":REM ERASE #
5ØØ GOSUB8ØØØ:IFQTTHEN3ØØ:REM CHECK FOR ¬
      ¬END OF GAME
51Ø PRINTRM$;"THERE ARE NO NUMBERS LEFT ¬
      ¬YOU CAN TAKE"
52Ø GOSUB1Ø4ØØ:REM PAUSE
53Ø FORG1=1TOHN
54Ø :IFN(G1)=ØTHEN 61Ø
55Ø :PRINTRM$;"r̲DR. FACTORr̂ GETS";G1
56Ø :N=G1:GOSUB75ØØ:REM LIGHT IT UP
```

```
570 :GOSUB1Ø4ØØ:REMPAUSE
58Ø :GOSUB76ØØ:REM ERASE
59Ø :S1=S1+G1:REM ADD TO DR FACTOR SCORE
6ØØ :GOSUB64ØØ:REM PRINT SCORE
61Ø NEXTG1
69Ø QG=SØ-S1
7ØØ GOSUB64ØØ:REM SCORE
7Ø5 PRINTRM$;
71Ø ONSGN(QG)+2 GOSUB75Ø,8ØØ,85Ø
72Ø GOSUB1Ø13Ø:REM GET
73Ø IFXA$="Y"THEN81ØØ
74Ø IFXA$="N"THEN9ØØ
745 GOTO72Ø:REM ERROR
75Ø W1=W1+1
76Ø PRINT"DR FACTOR WINS-HOW ABOUT A ¬
      ¬REMATCH?";
77Ø RETURN
8ØØ WØ=WØ+1
81Ø PRINT"A TIE-BUT YOU MAY TAKE A ¬
      ¬WIN-PLAY AGAIN";
82Ø RETURN
85Ø WØ=WØ+1
86Ø PRINT"r̲YOU WIN!r̂ TRY AGAIN?";
87Ø RETURN
9ØØ PRINTRM$;"↑";:END
999 END
5ØØØ PRINT"ĥ";:REM INSTRUCTIONS
5Ø1Ø PRINT"WELCOME TO DR. FACTOR."
5Ø15 PRINT
5Ø2Ø PRINT"YOU DO NOT HAVE TO KNOW WHAT ¬
      ¬A FACTOR"
5Ø25 PRINT
5Ø3Ø PRINT"IS TO PLAY THIS GAME,
      ¬ BUT IT SURE HELPS."
5Ø35 PRINT
5Ø4Ø PRINT"IT IS YOU AGAINST DR. FACTOR ¬
      ¬(THE PET"
5Ø45 PRINT
5Ø5Ø PRINT"WILL KEEP TRACK OF HIS MOVES ¬
      ¬FOR HIM)."
5Ø55 PRINT SC$;:GOSUB 1Ø1ØØ
5Ø6Ø PRINT"ĥYOU TRY TO END THE GAME ¬
      ¬WITH MORE"
```

```
5Ø65 PRINT
5Ø7Ø PRINT"POINTS THAN DR. FACTOR. YOU ¬
      ¬GET POINTS"
5Ø75 PRINT
5Ø8Ø PRINT"FROM EACH NUMBER YOU TAKE,
      ¬ EQUAL TO"
5Ø85 PRINT
5Ø9Ø PRINT"THAT NUMBER. FOR EXAMPLE,
      ¬ IF YOU TAKE"
5Ø95 PRINT
51ØØ PRINT"13 YOU WILL GET 13 POINTS.
51Ø5 PRINTSC$;:GOSUB1Ø1ØØ
51Ø8 PRINT"ĥTHE NUMBERS
51Ø9 PRINT
511Ø PRINT"THAT DR. FACTOR GETS DEPENDS ¬
      ¬ENTIRELY"
5115 PRINT
512Ø PRINT"ON YOUR CHOICE. HE GETS ¬
      ¬EVERY NUMBER"
5125 PRINT
513Ø PRINT"STILL AVAILABLE THAT IS A ¬
      ¬FACTOR OF"
5135 PRINT
514Ø PRINT"THE NUMBER YOU PICKED. THEN ¬
      ¬IT IS YOUR"
5145 PRINT
515Ø PRINT"TURN AGAIN. TO BE FAIR TO ¬
      ¬DR. FACTOR,"
5155 PRINT
516Ø PRINT"YOU MUST MAKE SURE HE GETS ¬
      ¬SOMETHING"
5165 PRINT
517Ø PRINT"EVERY TURN. THUS YOU MAY ¬
      ¬ONLY TAKE A"
5175 PRINT
518Ø PRINT"NUMBER THAT HAS AT LEAST ONE ¬
      ¬FACTOR"
5185 PRINT
519Ø PRINT"STILL AVAILABLE FOR DR. ¬
      ¬FACTOR TO TAKE."
5195 PRINT
52ØØ PRINT"IF YOU EVER CAN NOT TAKE A ¬
      ¬NUMBER, DR."
```

```
5205 PRINT
5210 PRINT"FACTOR GETS ALL THE NUMBERS ¬
      ¬THAT ARE"
5215 PRINT
5220 PRINT"LEFT. rHIT SPACE TO BEGINr̂";
5230 GOSUB10130:REM GET
5999 RETURN
6000 PRINT"ĥ"; : REM PRINT BOARD
6005 N=0 : REM INIT NUMBER
6010 PRINT"0@@2@@2@@2@@2@@2@@2@@2@@2@@2@
      ¬@."
6020 FORX=0TO(HN-1)/10
6030 :FORY=1TO10
6035 ::N=N+1:GOSUB7000:IFN>HNTHENNS$="&&
      ¬"
6040 ::PRINT"l";NS$;
6050 :NEXTY
6060 :PRINT"l"
6070 :PRINT"±";
6080 :FORY=1TO10
6090 ::PRINT"@@[";
6100 :NEXTY
6110 :PRINT"<3"
6120 NEXTX
6130 PRINT"↑-@@1@@1@@1@@1@@1@@1@@1@@1@@1
      ¬@@="
6199 RETURN
6200 PRINT"h"; : REM SIDELINE OF BOARD
6210 PRINTTAB(32);"r*PLAY*"
6220 PRINTTAB(32);"r  DR  "
6230 PRINTTAB(32);"rFACTOR"
6240 PRINTTAB(32);"------"
6250 PRINTTAB(32);"TRY TO"
6260 PRINTTAB(32);" TAKE"
6270 PRINTTAB(32);" MORE"
6280 PRINTTAB(32);"POINTS"
6290 PRINTTAB(32);" THAN"
6300 PRINTTAB(32);"  DR"
6310 PRINTTAB(32);"FACTOR"
6320 PRINTTAB(32);"------"
6330 PRINTTAB(32);" YOUR"
6340 PRINTTAB(32);"NUMBERS"
6350 PRINTTAB(32);"  r  r̂"
```

```
6360 PRINTTAB(32);"-------"
6370 PRINTTAB(32);"DR. F'S"
6380 PRINTTAB(32);"NUMBERS"
6390 PRINTTAB(32);"  OP"
6395 PRINTTAB(32);"  ##"
6400 PRINTRM$:PRINT"r↓SCOREr̂ r  PLAYER ¬
     ¬r̂ rWINSr̂ rAVERAGE"
6410 PRINTSØ;TAB(6);NM$;TAB(17);WØ;TAB(2
     ¬2);INT(AØ)
6420 PRINTS1;TAB(6);"DR. FACTOR";TAB(17)
     ¬;W1;TAB(22);INT(A1);"h"
6499 RETURN
7ØØØ NS$=RIGHT$(STR$(N),2):REM NUMBER ¬
     ¬TO STRING
7Ø99 RETURN
71ØØ PRINT"h↓"; : REM POSITION CURSOR ¬
     ¬TO NUMBER SPOT
711Ø IFN>1ØTHENPRINTLEFT$(ZD$,(INT((N-1)
     ¬/1Ø))*2);
712Ø PRINTLEFT$(ZR$,(N-(INT((N-1)/1Ø)*1Ø
     ¬))*3-2);
7199 RETURN
72ØØ FF=Ø:REM FIND FACTORS - FF IS ¬
     ¬FACTOR FOUND
721Ø FORQ=1TONN/2 : REM CHECK UP TO ¬
     ¬HALF WAY POINT
7215 :IFQ=1ANDN(Q)=ØTHEN728Ø
722Ø :DD=NN/Q:IFDD<>INT(DD)THEN728Ø :
     ¬ REM NOT A FACTOR
723Ø :IFN(DD)<1ANDN(Q)<1THEN728Ø:
     ¬ REM BOTH FACTORS TAKEN ALREADY
724Ø :IFFF=ØTHENSØ=SØ+NN:GOSUB78ØØ:
     ¬N(NN)=Ø:FF=1:GOSUB1Ø4ØØ
725Ø :IFN(DD)>ØTHENS1=S1+DD:N=DD:
     ¬GOSUB79ØØ
726Ø :IFN(Q)>ØTHENS1=S1+Q:N=Q:GOSUB79ØØ
728Ø NEXTQ
7299 RETURN
75ØØ GOSUB7ØØØ:REM N TO NS$
751Ø GOSUB71ØØ:REM POSITION CURSOR
752Ø PRINT"r";NS$;"<<";:REM PRINT ¬
     ¬REVERSE NUMBER AND POSITION CURSOR
7599 RETURN
76ØØ GOSUB75ØØ:REM POSITION CURSOR
```

```
7605 PRINT"r̂  ":REM ERASE NUMBER
7610 N(N)=Ø:REM ZERO NUMBER IN ARRAY
7699 RETURN
7700 PRINT"r̂";NS$:REM RETURN NUMBER
7710 N(NN)=1
7720 PRINTRM$;"NO FACTORS LEFT FOR";NN;"
      ¬-TRY ANOTHER";
7799 RETURN
7800 PRINTRM$;"r̲FACTOR FOUND, YOU ¬
      ¬GET";NN;"< POINTS":RETURN
7900 GOSUB75ØØ:REM REVERSE FIELD NUMBER
7910 PRINTRM$;"r̲DR. FACTORr̂ GETS";N;"SIN
      ¬CE IT IS A FACTOR"
7915 GOSUB1Ø4ØØ:REM PAUSE
7920 GOSUB76ØØ:REM ERASE NUMBER
7999 RETURN
8ØØØ QT=Ø:REM CHECK IF GAME OVER
8Ø1Ø FORGØ=HNTO1STEP-1
8Ø15 :IFQTTHEN8Ø9Ø
8Ø2Ø :IFN(GØ)=ØTHEN8Ø9Ø
8Ø3Ø :FORG1=1TOGØ/2
8Ø32 ::IFG1=1ANDN(G1)=ØTHEN8Ø8Ø
8Ø35 ::IFQTTHEN8Ø8Ø
8Ø4Ø ::DD=GØ/G1:IFDD<>INT(DD)THEN8Ø8Ø
8Ø5Ø ::IFN(DD)=ØANDN(G1)=ØTHEN8Ø8Ø
8Ø6Ø ::QT=1:REM FACTOR AVAILABLE
8Ø8Ø :NEXTG1
8Ø9Ø NEXTGØ
8Ø99 RETURN
81ØØ PRINT"ĥ"; : REM PLAY AGAIN
811Ø AØ=(AØ*NG+SØ)/(NG+1)
812Ø A1=(A1*NG+S1)/(NG+1)
813Ø SØ=Ø:S1=Ø:REM INIT SCORE FOR NEW ¬
      ¬GAME
814Ø NG=NG+1:REM INCREASE NUMBER OF ¬
      ¬GAMES COUNTER
815Ø GOTO2ØØ
1Ø1ØØ IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
      ¬CONTINUE r̂" : REM GET 1 CHARACTER
1Ø12Ø IFXX$<>" "THENPRINTXX$; : REM ¬
      ¬PRINT MESSAGE
1Ø13Ø GETXA$:IFXA$>""THEN1Ø13Ø:REM ¬
      ¬CLEAR BUFFER
1Ø14Ø GETXA$:IFXA$=""THEN1Ø14Ø
```

```
 1Ø15Ø XA=VAL(XA$)
 1Ø199 XX$="":RETURN
 1Ø2ØØ IFXP$=""THENXP$="?" : REM SET ¬
       ¬DEFAULT PROMPT - INPUT WITH PROMPT
 1Ø22Ø GETXA$:IFXA$<>""THEN1Ø22Ø:
       ¬REM CLEAR BUFFER
 1Ø25Ø XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
       ¬4):REM SET UP FOR PROMPT
 1Ø26Ø PRINTXQ$;XB$;:REM PRINTS THE ¬
       ¬QUESTION FOLLOWED WITH PROPOSED ¬
       ¬ANSWER
 1Ø27Ø INPUTXA$
 1Ø28Ø XA=VAL(XA$)
 1Ø299 XP$="":XB$="":XQ$="":RETURN
 1Ø4ØØ IFXP=ØTHENXP=3:REM PAUSE
 1Ø42Ø XJ=TI+6Ø*XP
 1Ø43Ø IFTI<XJTHEN1Ø43Ø
 1Ø499 XJ=Ø:XP=Ø:RETURN
READY.
```

Chapter 4

Games of Chance

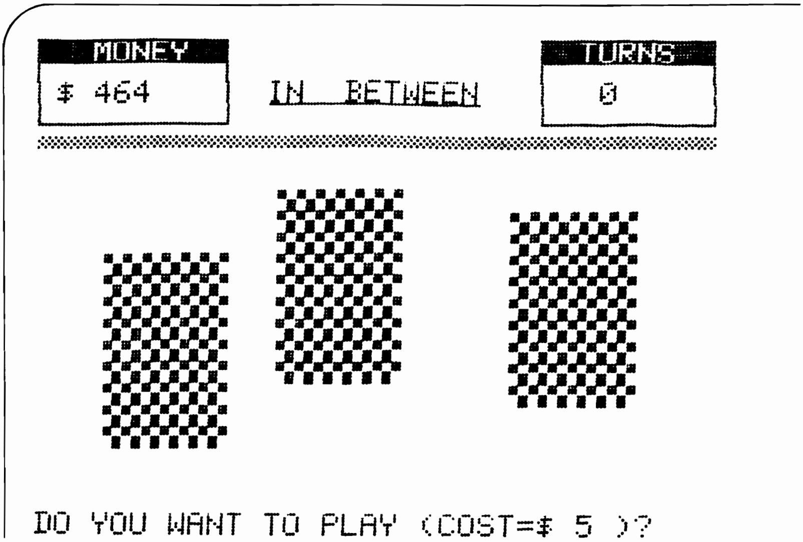
In Between

by Len Lindsay

In Between is an enjoyable card game, better known as "Acey Deucey." Len adapted this casino diversion for your PET, complete with casino rules and entry fees; score-keeping; and last but not least, card faces drawn directly on your screen.

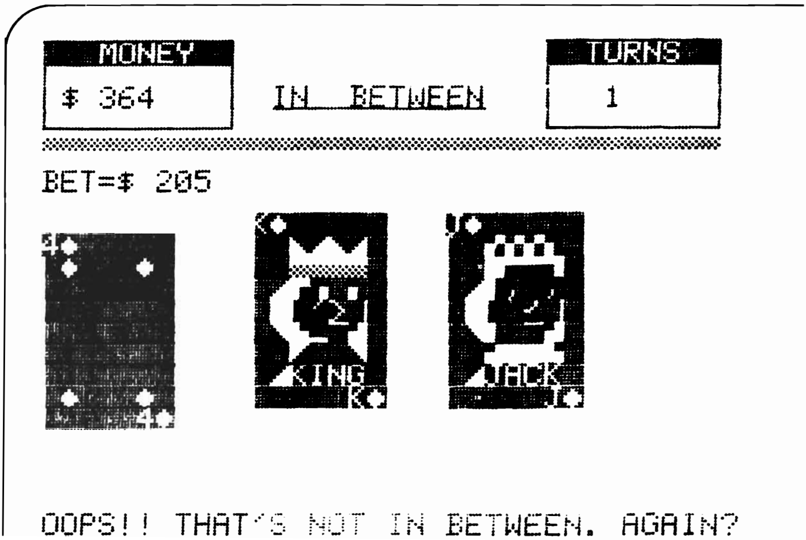
The object is to guess whether the value of the card in the middle of a deck of three will be "in between" the value of the other two cards. For example, the croupier deals you a 2 of spades and a Queen of Hearts. You bet that the third card will be in between the value of the 2 and the Queen. The dealer turns over the third card—it's a 5! You've won your first bet at *In Between*.

Here are the Casino Rules: You need at least $100 to play (thoughtfully provided by your PET bank). The casino entry fee is varied from game to game randomly. The computer shuffles and shows you the first card. Your minimum bet will vary. When the computer shuffles and shows you the second card, you can add to your bet. The odds are doubled when you win. See if you can break the bank!

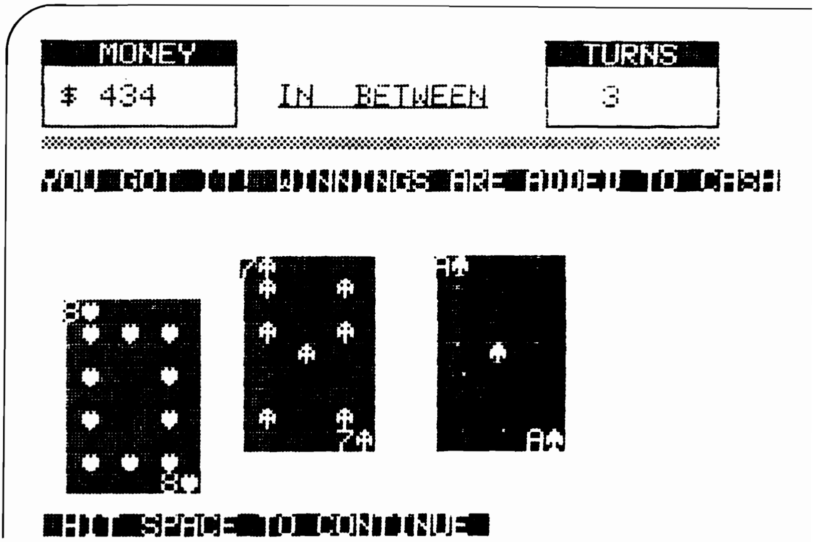


```
 MONEY                              TURNS
$ 464          IN  BETWEEN            0

DO YOU WANT TO PLAY (COST=$ 5 )?
```

To illustrate the fine graphics in this program, here are scenes from several different runs:



```
 MONEY                              TURNS
$ 364          IN  BETWEEN            1

BET=$ 205

OOPS!! THAT'S NOT IN BETWEEN. AGAIN?
```



MONEY

$ 434

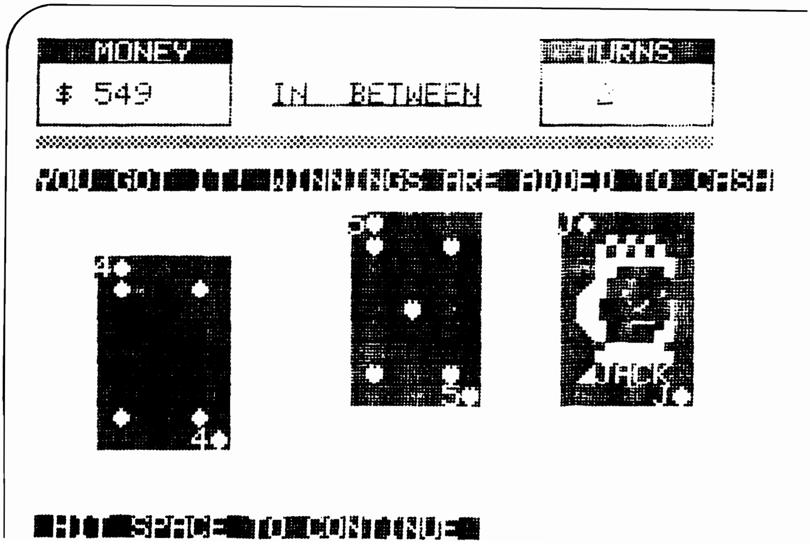
IN BETWEEN

TURNS

3

YOU GOT IT! WINNINGS ARE ADDED TO CASH

HIT SPACE TO CONTINUE



MONEY

$ 549

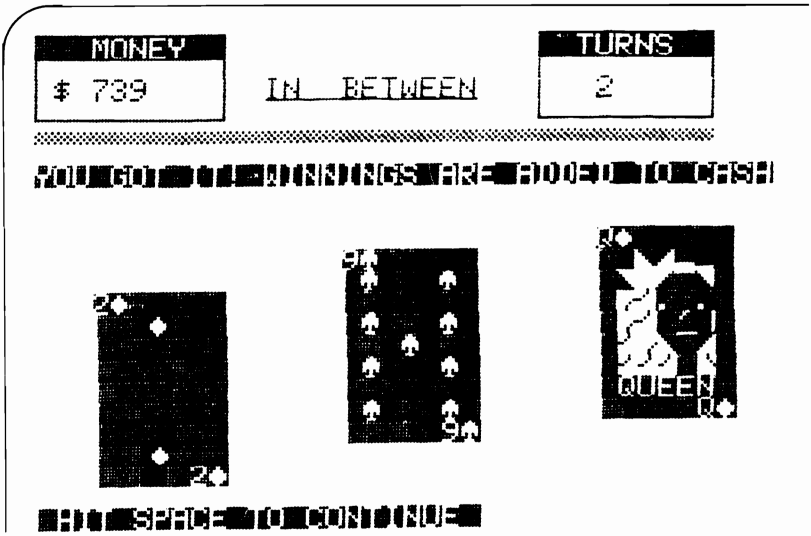
IN BETWEEN

TURNS

2

YOU GOT IT! WINNINGS ARE ADDED TO CASH

HIT SPACE TO CONTINUE



Warning to business-keyboard owners: Make friends with the owner of a non-Business keyboard PET and tape this program. You won't have any trouble loading this tape on your Business PET, but you could spend a fortune trying to substitute graphics.

Future cardsharps who would like to modify Len's program are advised to make one change at a time. There are routines to shuffle the deck, fill the deck, and draw the cards graphically on the screen, including card faces. Try placing a bet that you can improve this program. It's possible, but not easy!

Level B: Plan to invest your winnings in a nice, new PET.

```
Ø REM WORKS ON PET 2ØØ1-8, NEW PET/CBM,
      ¬ BASIC 4.Ø, & CBM 8Ø16 & CBM 8Ø32
1 REM *** IN BETWEEN
2 REM *** WITH FULL GRAPHIC CARDS
3 REM *** ORIGINAL PROGRAM
4 REM *** (C) 198Ø
5 REM *** LEN LINDSAY
6 REM *** Ø4-21-8Ø
9 REM *** USES MAIN SUBROUTINES 1Ø1ØØ,
      ¬ 1Ø2ØØ
1Ø POKE 59468,12
15 XQ=RND(-TI)
3Ø DIM XC$(4,11),XD$(51)
4Ø DEF FNR(N)=INT(RND(1)*N+1)
5Ø ZS$="                                   ¬
      ¬        ":REM 39 SPACE
52 ZL$="←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←
      ¬←←←←←←←←":REM 39LEFT
54 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→":REM 39RIGHT
56 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":
      ¬REM 23 DOWN
6Ø BL$="h̲↓↓↓↓↓↓↓↓":REM TO BET LINE
62 RM$="h̲"+ZD$+ZS$+"↑":REM TO LINE 24
68 XA$="WELCOME TO ** IN BETWEEN ** AN ¬
      ¬ENJOYABLE CARD GAME."
7Ø PRINT"ĥr̲";
72 GOSUB74
73 PRINT"r̂";RM$:PRINT"HIT r̲SPACEr̂ TO ¬
      ¬START":GOTO8Ø
74 FORXF=ØTO51
76 :PRINTMID$(XA$,XF+1,1);
78 :GOTO2542Ø:REM ADD CARD TO ARRAY ¬
      ¬INCLUDES NEXT XF & RETURN
8Ø GETA$:IFA$>""THEN9Ø
82 XC$=XD$(FNR(52)-1):XX=1:YY=4:
      ¬GOSUB25ØØØ:GOTO8Ø
9Ø PRINT"ĥDO YOU NEED INSTRUCTIONS?"
92 GOSUB1Ø13Ø
94 IFXA$="Y"THENGOSUB5ØØØ:GOTO1ØØ
96 IFXA$<>"N"THEN92
1ØØ PRINT"ĥ"
```

```
105 XQ$="↓HOW MUCH CASH DO YOU HAVE":
      ¬GOSUB1Ø2ØØ
110 CASH=XA:IFCASH<1ØØTHENPRINT"ĥr̲YOU ¬
      ¬NEED AT LEAST 1ØØ DOLLARS TO ¬
      ¬PLAY":GOTO1Ø5
115 IFCASH>5ØØØØØTHENPRINT"ĥYOU NEED A ¬
      ¬POLICE ESCORT FOR THAT MONEY!":
      ¬GOTO1Ø5
12Ø MIN=INT(1Ø^(LEN(STR$(CASH))-3))/2
15Ø XA=INT(CASH*.Ø1*FNR(1Ø))+1
16Ø PRINT"↓↓r̲CASINO ENTRY FEE IS $";XA
17Ø CASH=CASH-XA
18Ø PRINT"↓YOU NOW HAVE $";CASH;"↓"
19Ø GOSUB1Ø1ØØ
2ØØ GOSUB6ØØØ:REM INITIAL DISPLAY
5ØØ PRINTBL$;:FORA=1TO16:PRINTZS$:NEXT
6ØØ PRINTRM$:PRINT"SHUFFLING";:GOSUB255Ø
      ¬Ø:PRINTRM$
61Ø X1=FNR(4)
62Ø X2=FNR(5)+X1+8
63Ø X3=FNR(5)+X2+8
64Ø Y1=FNR(6)+8
65Ø Y2=FNR(6)+8
66Ø Y3=FNR(6)+8
67Ø C1$=XD$(Ø)
68Ø C2$=XD$(1)
69Ø C3$=XD$(2)
7ØØ GOSUB61ØØ
71Ø GOSUB111Ø:GOSUB121Ø:GOSUB131Ø
72Ø PRINTRM$:PRINT"DO YOU WANT TO PLAY ¬
      ¬(COST=$";MIN;")?";:GOSUB1Ø13Ø:
      ¬PRINTRM$
73Ø IFXA$="Y"THEN8ØØ
74Ø IFXA$<>"N"THEN72Ø
75Ø PRINTRM$:PRINT"DO YOU WANT NEW ¬
      ¬CARDS?";:GOSUB1Ø13Ø:PRINTRM$
76Ø IFXA$="Y"THEN5ØØ
77Ø IFXA$<>"N"THEN75Ø
78Ø PRINTRM$:PRINT"ITS BEEN FUN - TRY ¬
      ¬AGAIN LATER↑↑";:END
8ØØ BET=MIN
81Ø CASH=CASH-BET
82Ø TURN=TURN+1
```

```
83Ø GOSUB61ØØ
84Ø PRINTBL$;"BET=$";BET
85Ø GOSUB11ØØ
86Ø GOSUB2ØØØ
87Ø GOSUB13ØØ
88Ø XA$=C1$:GOSUB3ØØØ:C1=XA
89Ø XA$=C2$:GOSUB3ØØØ:C2=XA
9ØØ XA$=C3$:GOSUB3ØØØ:C3=XA
91Ø GOSUB2ØØØ
92Ø GOSUB12ØØ
93Ø IFC1<C2ANDC2<C3THEN96Ø:REM WIN
94Ø IFC1>C2ANDC2>C3THEN96Ø:REM WIN
95Ø PRINTRM$:PRINT"OOPS!! THAT'S NOT IN ¬
      ¬BETWEEN. AGAIN?";:GOSUB1Ø13Ø
955 IFXA$="N"THENPRINTRM$:PRINT"SEE YOU ¬
      ¬LATER↑↑";:END
957 IFXA$<>"Y"THEN95Ø
959 GOTO5ØØ
96Ø CASH=CASH+2*BET
97Ø PRINTBL$;"r̲YOU GOT IT! WINNINGS ARE ¬
      ¬ADDED TO CASHr̂":GOSUB61ØØ
98Ø PRINTRM$:GOSUB1Ø1ØØ
99Ø IFCASH<MITHENPRINTRM$:PRINT"YOU ¬
      ¬DON'T HAVE ENOUGH CASH FOR ¬
      ¬ANOTHER↑↑";:END
992 IFCASH>999999THENPRINTRM$:PRINT"r̲YOU
      ¬ BROKE THE BANK WITH $";CASH:END
995 GOTO5ØØ
999 END
11ØØ XC$=C1$
111Ø XX=X1:YY=Y1:GOSUB25ØØØ
1199 RETURN
12ØØ XC$=C2$
121Ø XX=X2:YY=Y2:GOSUB25ØØØ
1299 RETURN
13ØØ XC$=C3$
131Ø XX=X3:YY=Y3:GOSUB25ØØØ
1399 RETURN
2ØØØ PRINTRM$:XQ$="WHAT ADDITIONAL ¬
      ¬BET(Ø=NONE)":GOSUB1Ø2ØØ:IFXA>CASHO
      ¬RXA<ØTHEN86Ø
2Ø1Ø BET=BET+XA:CASH=CASH-XA:GOSUB61ØØ:
      ¬PRINTRM$;BL$;"BET=$";BET:RETURN
```

```
3ØØØ XA=VAL(XA$):IFXATHENRETURN
3Ø1Ø XA$=LEFT$(XA$,1)
3Ø2Ø IFXA$="J"THENXA=11
3Ø3Ø IFXA$="Q"THENXA=12
3Ø4Ø IFXA$="K"THENXA=13
3Ø99 RETURN
5ØØØ PRINT"ĥWELCOME TO THE CARD GAME OF
5Ø1Ø PRINT"↓IN BETWEEN (ALSO KNOWN AS ¬
       ¬ACEY DEUCY"
5Ø2Ø PRINT"↓YOU BET WHETHER THE MIDDLE ¬
       ¬OF THREE"
5Ø3Ø PRINT"↓CARDS WILL BE IN BETWEEN ¬
       ¬THE OTHER"
5Ø4Ø PRINT"↓TWO CARDS IN VALUE. YOU GET ¬
       ¬DOUBLE"
5Ø5Ø PRINT"↓YOUR BET BACK IF YOU WIN.↓"
5Ø99 GOSUB1Ø1ØØ
5999 RETURN
6ØØØ PRINT"ĥ";:REM DRAW BOARD
6ØØ5 PRINT"$$$$$$$$$$                 ¬
       ¬$$$$$$$$$"
6Ø1Ø PRINT"r   MONEY  r̂                ¬
       ¬r  TURNS  r̂"
6Ø2Ø PRINT "O########P               ¬
       ¬O#######P"
6Ø3Ø PRINT "%$       '  IN  BETWEEN   % ¬
       ¬      '"
6Ø4Ø PRINT "L$$$$$$$$:  EEEEEEEEEEE   ¬
       ¬L$$$$$$$:"
6Ø5Ø PRINT "((((((((((((((((((((((((((((
       ¬((((((("
61ØØ PRINT"h↓↓↓→→_______←←←←←←←";CASH
62ØØ PRINT"h↓↓↓";LEFT$(ZR$,28);TURN
6999 RETURN
1Ø1ØØ IFXX$=""THENXX$="r HIT SPACE TO ¬
       ¬CONTINUE r̂" : REM GET 1 CHARACTER
1Ø12Ø IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
1Ø13Ø GETXA$:IFXA$>""THEN1Ø13Ø:REM ¬
       ¬CLEAR BUFFER
1Ø14Ø GETXA$:IFXA$=""THEN1Ø14Ø
1Ø15Ø XA=VAL(XA$)
1Ø199 XX$="":RETURN
```

```
10200 IFXP$=""THENXP$="?" : REM SET ¬
      ¬DEFAULT PROMPT - INPUT WITH PROMPT
10220 GETXA$:IFXA$<>""THEN10220:
      ¬REM CLEAR BUFFER
10250 XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
      ¬4):REM SET UP FOR PROMPT
10260 PRINTXQ$;XB$;:REM PRINTS THE ¬
      ¬QUESTION FOLLOWED WITH PROPOSED ¬
      ¬ANSWER
10270 INPUTXA$
10280 XA=VAL(XA$)
10299 XP$="":XB$="":XQ$="":RETURN
25000 REM*** CARD DRAWING INITALIZE ***
25010 XB$=XC$ : XE$="r̂<r" : REM DEFAULT
25012 IF XC$<>"?" THEN XB$="_" :
      ¬ XE$="r%"
25020 FOR YZ=1 TO 11
25030 :FOR XZ=1 TO 4
25040 ::XC$(XZ,YZ)=XB$+XB$
25050 ::IF XZ=1 THEN XC$(XZ,YZ)=XE$
25060 :NEXT XZ
25070 NEXT YZ
25080 XC$(4,11)=XC$(4,11)+"r̂"
25112 IF XC$="?" THEN 25199
25113 XN=VAL(XC$) : IF XN=0 THEN GOSUB ¬
      ¬25210
25114 XS$=RIGHT$(XC$,1)+"_"
25116 IF XN=1 THEN XC$="A"+RIGHT$(XC$,1)
25120 XC$(1,1)="r"+XC$
25122 XC$(2,1)="":IFXN<>10 THEN XC$(2,
      ¬1)="_"
25130 IFXN<4 THEN 25160
25132 XC$(2,3)=XS$
25134 XC$(4,3)=XS$
25136 XC$(2,9)=XS$
25138 XC$(4,9)=XS$
25140 IF XN<6 THEN 25160
25142 XC$(2,5)=XS$
25144 XC$(4,5)=XS$
25150 IF XN<8 THEN 25160
25152 XC$(2,7)=XS$
25154 XC$(4,7)=XS$
```

```
25160 IF XN/2 <> INT(XN/2) THEN XC$(3,
      ¬6)=XS$
25170 IF XN=3 OR XN=2 OR XN=8 OR XN=1Ø ¬
      ¬THEN XC$(3,3)=XS$ : XC$(3,9)=XS$
2518Ø XC$(4,11)=XC$+"r̂"
2519Ø IFXN=1Ø THEN XC$(3,11)=" "
25199 GOTO253ØØ
252ØØ REM*** FACE CARD SUBSTITUTE ***
2521Ø XQ$=LEFT$(XC$,1):IFXQ$="J"THEN2523
      ¬7
25213 IFXQ$="K"THEN25258
25216 XC$(2,3)="r r̂^)r/$_"
25219 XC$(2,4)="r^r̂ r)8^_"
25222 XC$(2,5)="r̂UKr._._"
25225 XC$(2,6)="r̂UKr_'r'_"
25228 XC$(2,7)="r̂KU^r7r̂)r_"
25231 XC$(2,8)="r̂KKKr_r̂Jr_"
25234 XC$(2,9)="rQUEEN ":GOTO25279
25237 XC$(2,3)="r_r̂???r;_"
2524Ø XC$(2,4)="r_r̂_"";r_"
25243 XC$(2,5)="r̂)r!,_,_"
25246 XC$(2,6)="r̂_r4_K*_"
25249 XC$(2,7)="r^!_7r̂>r_"
25252 XC$(2,8)="r_r̂>__<r_"
25255 XC$(2,9)="r̂)rJACK_":GOTO25279
25258 XC$(2,3)="r_r̂^)^)r_"
25261 XC$(2,4)="r r̂((((r_"
25264 XC$(2,5)="r̂),r, ;r_"
25267 XC$(2,6)="r̂_r4'>*r_"
2527Ø XC$(2,7)="r^r̂<r/7r̂>r_"
25273 XC$(2,8)="r_)__^_"
25276 XC$(2,9)="r̂)rKING_"
25279 FORYZ=3TO9
25282 :FORXZ=3TO4
25285 ::XC$(XZ,YZ)=""
25288 :NEXTXZ
25291 NEXTYZ
25299 RETURN
253ØØ REM *** DRAW THE CARD
253Ø1 REM XC$(X,Y) IS THE CARD GRAPHICS
253Ø2 REM XX & YY ARE THE START CORNER ¬
      ¬COORDINATES
```

```
 253Ø3 REM CARD GRAPHICS ARE FOR 7 BY 11 ¬
       ¬CARD - BUT LINE 2533Ø MAKES IT 7 ¬
       ¬BY 9
 2531Ø PRINT"h";
 25312 IFYY>1THENPRINTLEFT$(ZD$,YY-1);
 2532Ø FORXG=1TO11
 2533Ø :IFXG=2ORXG=1ØTHENNEXT
 25335 :IFXX>1THENPRINTLEFT$(ZR$,XX-1);
 2534Ø :FORXH=1TO4
 2535Ø ::PRINTXC$(XH,XG);
 2536Ø :NEXT
 2537Ø :PRINT
 2538Ø NEXT
 25399 XC$="?":RETURN
 254ØØ REM *** FILL DECK ARRAY
 2541Ø FORXF=ØTO51
 2542Ø :XG=INT(XF/13)
 2543Ø :XG$="S":IFXGTHENXG$="Z":IFXG>1THE
       ¬NXG$="X":IFXG>2THENXG$="A"
 2544Ø :XH=XF-(13*XG)+1
 2545Ø :XH$=MID$(STR$(XH),2,1)
 2546Ø :IFXH>1ØTHENXH$="J":IFXH>11THENXH$
       ¬="Q":IFXH>12THENXH$="K"
 2547Ø :XD$(XF)=XH$+XG$
 2548Ø NEXT XF
 25499 RETURN
 255ØØ REM *** SHUFFLE DECK
 2551Ø FORXF=ØTO51
 2552Ø :XG=FNR(52)-1
 2553Ø :XG$=XD$(XG)
 2554Ø :XD$(XG)=XD$(XF)
 2555Ø :XD$(XF)=XG$
 2556Ø NEXT XF
 25599 RETURN
READY.
```

Thrice Dice

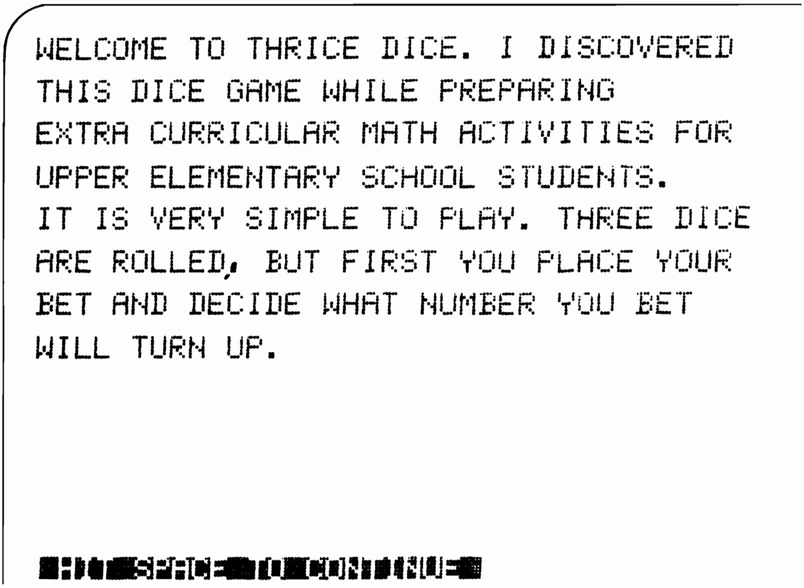
by Len Lindsay

Thrice Dice is Len's version of an old dice game that will tempt you to gamble recklessly with fortune (and challenge you to think about strategy).

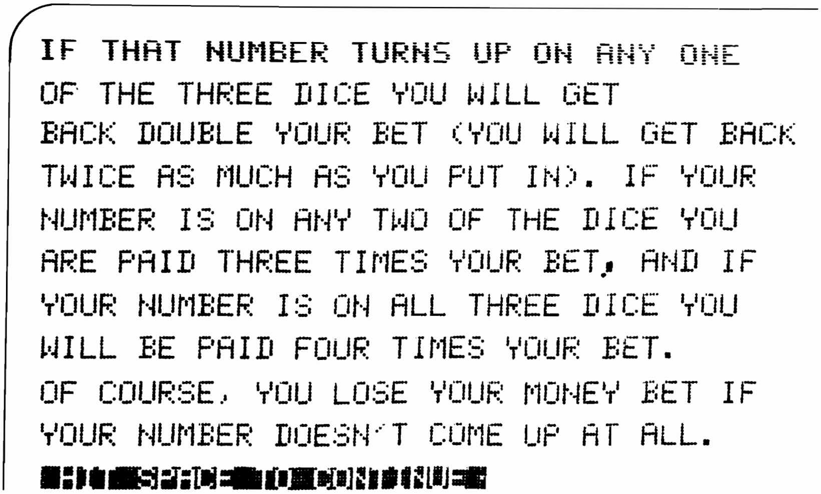
You can win big with the right guess. Pick one number from 1 to 6 and place your bet. If your number turns up once, you get double your money back. If it turns up twice, you get three times your money back. If your lucky number comes up three times, you get *four times your money back*!

You need a mere $100 to play, and the casino fee will vary. How can you resist, with such odds?

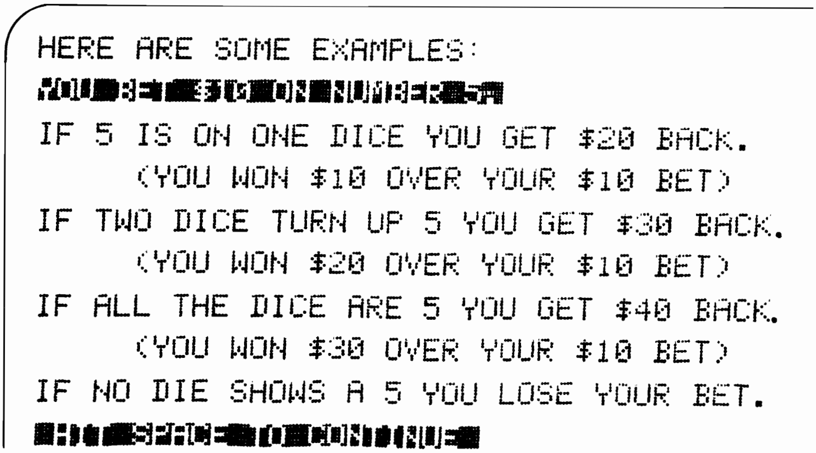
You have a 50:50 chance of winning, you figure. Or do you? Can you determine the exact odds of winning? Are the odds really on your side? How will you get rich gambling on your PET?



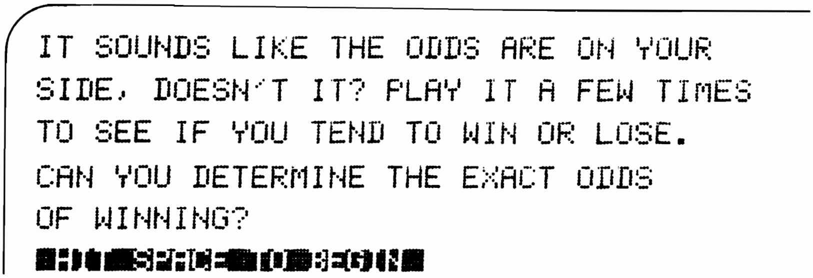
```
WELCOME TO THRICE DICE. I DISCOVERED
THIS DICE GAME WHILE PREPARING
EXTRA CURRICULAR MATH ACTIVITIES FOR
UPPER ELEMENTARY SCHOOL STUDENTS.
IT IS VERY SIMPLE TO PLAY. THREE DICE
ARE ROLLED, BUT FIRST YOU PLACE YOUR
BET AND DECIDE WHAT NUMBER YOU BET
WILL TURN UP.




[illegible]
```



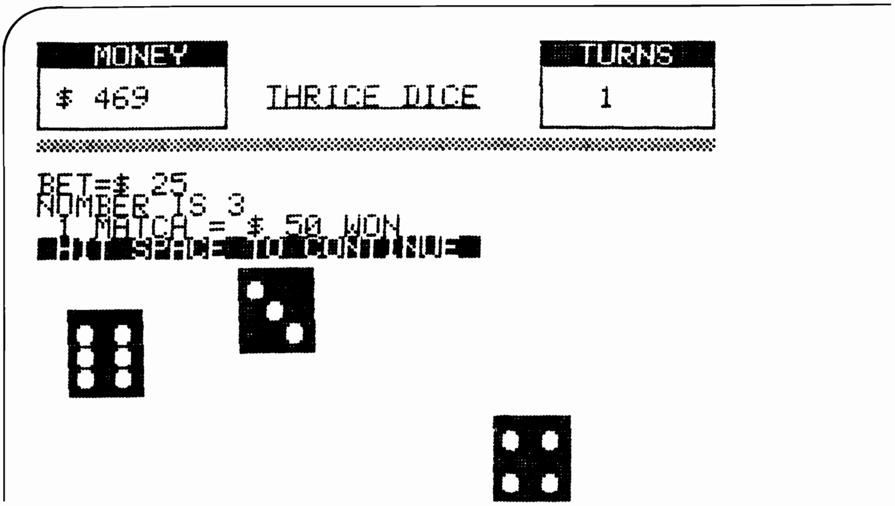
```
IF THAT NUMBER TURNS UP ON ANY ONE
OF THE THREE DICE YOU WILL GET
BACK DOUBLE YOUR BET (YOU WILL GET BACK
TWICE AS MUCH AS YOU PUT IN). IF YOUR
NUMBER IS ON ANY TWO OF THE DICE YOU
ARE PAID THREE TIMES YOUR BET, AND IF
YOUR NUMBER IS ON ALL THREE DICE YOU
WILL BE PAID FOUR TIMES YOUR BET.
OF COURSE, YOU LOSE YOUR MONEY BET IF
YOUR NUMBER DOESN'T COME UP AT ALL.
HIT SPACE TO CONTINUE
```



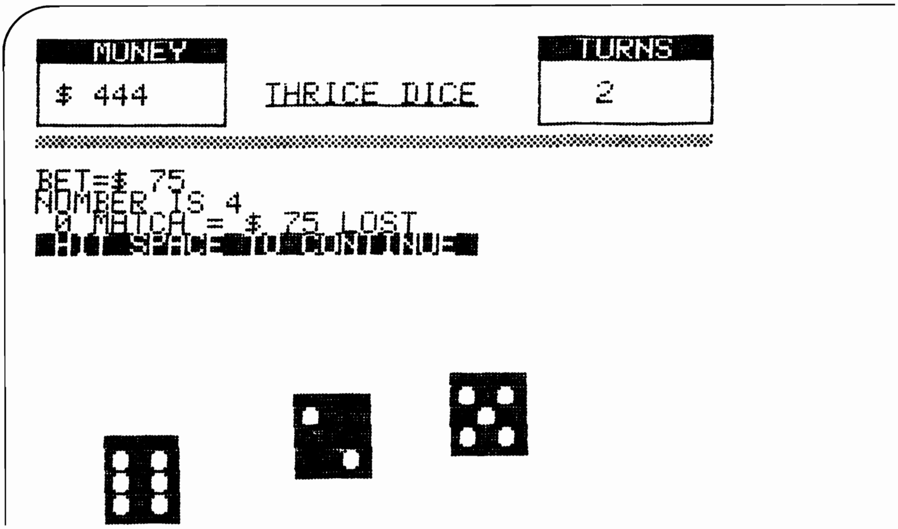
```
HERE ARE SOME EXAMPLES:
YOU BET $10 ON NUMBER 5
IF 5 IS ON ONE DICE YOU GET $20 BACK.
      (YOU WON $10 OVER YOUR $10 BET)
IF TWO DICE TURN UP 5 YOU GET $30 BACK.
      (YOU WON $20 OVER YOUR $10 BET)
IF ALL THE DICE ARE 5 YOU GET $40 BACK.
      (YOU WON $30 OVER YOUR $10 BET)
IF NO DIE SHOWS A 5 YOU LOSE YOUR BET.
HIT SPACE TO CONTINUE
```



```
IT SOUNDS LIKE THE ODDS ARE ON YOUR
SIDE, DOESN'T IT? PLAY IT A FEW TIMES
TO SEE IF YOU TEND TO WIN OR LOSE.
CAN YOU DETERMINE THE EXACT ODDS
OF WINNING?
HIT SPACE TO BEGIN
```



```
MONEY                            TURNS
$ 469        THRICE DICE           1

BET=$ 25
NUMBER IS 3
 1 MATCH = $ 50 WON
 HIT SPACE TO CONTINUE
```



```
MONEY                            TURNS
$ 444        THRICE DICE           2

BET=$ 75
NUMBER IS 4
 0 MATCH = $ 75 LOST
 HIT SPACE TO CONTINUE
```

Other casino managers may want to use the routine for displaying dice on the screen in programs of their own. It will work in all PET/CBM models.

Business managers will once more have to substitute graphics. The result won't be quite as spiffy as the graphics on other PET models, but they'll suffice.

SHIFT : is the bottom right corner of the box. Substitute SHIFT R.

SHIFT $ is the underlining. Substitute SHIFT R.

SHIFT % is the left side of a box. Substitute SHIFT T.

SHIFT / is the right side of a box. Substitute SHIFT Y.

SHIFT (is half a gray box. Substitute SHIFT C.

The dice drawing in lines 10025-20020 use graphics that aren't available on a business keyboard. Try:

```
2ØØ25  PRINT
2ØØ26  PRINT TAB(XX); "[SPACE] [RVS] [3 SPACE] [OFF] "
2ØØ27  PRINT TAB(XX); "[SPACE] [RVS] [3 SPACE] [OFF]"
2ØØ28  PRINT TAB(XX); "[SPACE] [RVS] [3 SPACE] [OFF] "
2ØØ29   PRINT
```

Level B. Roll 'em!

```
Ø REM WORKS ON PET 2ØØ1-8, NEW PET/CBM,
      ¬ BASIC 4.Ø, & CBM 8Ø32 & 8Ø16
1 REM*** THRICE DICE
2 REM***ORIGINAL PROGRAM
3 REM***(C) 198Ø LEN LINDSAY
4 REM***Ø4-2Ø-8Ø
1Ø POKE 59468,12 : REM GRAPHIC MODE
15 XQ=RND(-TI) : REM SEED RND
2Ø PRINT"ĥ"; : REM CLEAR SCREEN
3Ø DIM R(3)
4Ø DEF FNR(N)=INT(RND(1)*N+1) : REM RND#
5Ø ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓" :
      ¬ REM 23 DOWN
52 ZS$="                                    ¬
      ¬          ":REM 39 SPACES
```

```
54 RM$="h̲"+ZD$+ZS$+"↑":REM TO LINE 24 ¬
      ¬WITH CLEAR LINE 24
56 BL$="h̲↓↓↓↓↓↓↓":REM TO BET LINE
58 ZL$="←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←
      ¬←←←←←←←←":REM 39 LEFT
60 ZR$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→":REM 39 RIGHT
70 PRINT"↓↓↓↓↓↓↓↓→→→→→→→→THRICE DICE
72 PRINT"↓↓↓↓↓→→→→→→→→→HIT r̲SPACEr̂
74 GOSUB20000
76 GET A$ : IF A$<>CHR$(32) THEN 74
80 PRINT"ĥDO YOU NEED INSTRUCTIONS?"
85 GET A$ : IF A$="Y" THEN GOSUB5000:
      ¬GOTO100
87 IF A$="N" THEN 100
89 GOTO85
100 PRINT"ĥ"
105 PRINT"↓HOW MUCH CASH DO YOU HAVE";:
      ¬GOSUB10200
110 CASH=XA:IFCASH<100THENPRINT"ĥr̲YOU ¬
      ¬NEED AT LEAST 100 DOLLARS TO ¬
      ¬PLAY":GOTO105
115 IFCASH>500000THENPRINT"ĥYOU NEED A ¬
      ¬POLICE ESCORT FOR THAT MONEY!":
      ¬GOTO105
120 MIN=INT(10^(LEN(STR$(CASH))-3))/2
150 XA=INT(CASH*.01*FNR(10))+1
160 PRINT"↓↓r̲CASINO ENTRY FEE IS $";XA
170 CASH=CASH-XA
180 PRINT"↓YOU NOW HAVE $";CASH;"↓"
190 GOSUB10100
200 GOSUB6000:REM INITIAL DISPLAY
300 GOSUB6100:PRINTRM$:PRINT"WHAT IS ¬
      ¬YOUR BET (MIN="MIN;")";:GOSUB10200
310 BET=INT(XA)
320 IFBET<MINORBET>CASHTHEN300
330 PRINTBL$;"BET=$";BET
340 TURN=TURN+1
350 CASH=CASH-BET:GOSUB6100
400 PRINTRM$:XX$="r̲WHAT IS YOUR NUMBER ¬
      ¬(1-6)r̂?":GOSUB10100:PRINTRM$
410 IFXA<1ORXA>6THEN400
420 NUMBER=XA
430 PRINTBL$;"↓NUMBER IS";NUMBER
```

```
500 R1=FNR(1Ø)+5
51Ø R2=FNR(1Ø)+5
52Ø R3=FNR(1Ø)+5
53Ø X1=FNR(8)
54Ø X2=FNR(8)+X1+5
55Ø X3=FNR(8)+X2+5
56Ø Y1=FNR(9)+11
57Ø Y2=FNR(9)+11
58Ø Y3=FNR(9)+11
6ØØ FORC=1TO16
61Ø IFR1<CTHEN63Ø
62Ø XX=X1:YY=Y1:GOSUB2ØØØØ:D1=XD
63Ø IFR2<CTHEN65Ø
64Ø XX=X2:YY=Y2:GOSUB2ØØØØ:D2=XD
65Ø IFR3<CTHEN67Ø
66Ø XX=X3:YY=Y3:GOSUB2ØØØØ:D3=XD
67Ø NEXTC
7ØØ MATCH=Ø
71Ø IFNUMBER=D1THENMATCH=MATCH+1
72Ø IFNUMBER=D2THENMATCH=MATCH+1
73Ø IFNUMBER=D3THENMATCH=MATCH+1
74Ø XA$="LOST":IFMATCHTHENXA$="WON":
      ¬GAIN=BET*(MATCH+1):CASH=CASH+GAIN
75Ø PRINTBL$;"↓↓";MATCH;"MATCH = $";
76Ø IFMATCHTHENPRINTGAIN;:GOTO78Ø
77Ø PRINTBET;
78Ø PRINTXA$
79Ø GOSUB1Ø1ØØ
8ØØ GOSUB61ØØ:PRINTBL$;:FORX=1TO17:
      ¬PRINTZS$:NEXTX
81Ø IFCASH>999999THEN8ØØØ
82Ø IFCASH<MINGOTO9ØØØ
9ØØ GOTO3ØØ
999 END
5ØØØ PRINT"ĥ"; : REM INSTRUCTIONS
5Ø1Ø PRINT"WELCOME TO THRICE DICE. I ¬
      ¬DISCOVERED"
5Ø2Ø PRINT"↓THIS DICE GAME WHILE ¬
      ¬PREPARING"
5Ø3Ø PRINT"↓EXTRA CURRICULAR MATH ¬
      ¬ACTIVITIES FOR"
5Ø4Ø PRINT"↓UPPER ELEMENTARY SCHOOL ¬
      ¬STUDENTS."
```

```
5Ø5Ø PRINT"↓IT IS VERY SIMPLE TO PLAY. ¬
      ¬THREE DICE"
5Ø6Ø PRINT"↓ARE ROLLED. BUT FIRST YOU ¬
      ¬PLACE YOUR"
5Ø7Ø PRINT"↓BET AND DECIDE WHAT NUMBER ¬
      ¬YOU BET"
5Ø8Ø PRINT"↓WILL TURN UP.↓"
5Ø82 GOSUB1Ø1ØØ
5Ø85 PRINT"ĥIF THAT NUMBER TURNS UP ON ¬
      ¬ANY ONE"
5Ø9Ø PRINT"↓OF THE THREE DICE YOU WILL ¬
      ¬GET"
51ØØ PRINT"↓BACK DOUBLE YOUR BET (YOU ¬
      ¬WILL GET BACK"
511Ø PRINT"↓TWICE AS MUCH AS YOU PUT ¬
      ¬IN). IF YOUR"
512Ø PRINT"↓NUMBER IS ON ANY TWO OF THE ¬
      ¬DICE YOU"
513Ø PRINT"↓ARE PAID THREE TIMES YOUR ¬
      ¬BET. AND IF"
514Ø PRINT"↓YOUR NUMBER IS ON ALL THREE ¬
      ¬DICE YOU"
515Ø PRINT"↓WILL BE PAID FOUR TIMES ¬
      ¬YOUR BET."
516Ø PRINT"↓OF COURSE, YOU LOSE YOUR ¬
      ¬MONEY BET IF"
517Ø PRINT"↓YOUR NUMBER DOESN'T COME UP ¬
      ¬AT ALL.↓"
519Ø GOSUB1Ø1ØØ
52ØØ PRINT"ĥHERE ARE SOME EXAMPLES:
521Ø PRINT"↓r̲YOU BET $1Ø ON NUMBER 5.
522Ø PRINT"↓IF 5 IS ON ONE DICE YOU GET ¬
      ¬$2Ø BACK."
523Ø PRINT"↓     (YOU WON $1Ø OVER YOUR ¬
      ¬$1Ø BET)"
524Ø PRINT"↓IF TWO DICE TURN UP 5 YOU ¬
      ¬GET $3Ø BACK"
525Ø PRINT"↓     (YOU WON $2Ø OVER YOUR ¬
      ¬$1Ø BET)
526Ø PRINT"↓IF ALL THE DICE ARE 5 YOU ¬
      ¬GET $4Ø BACK"
527Ø PRINT"↓     (YOU WON $3Ø OVER YOUR ¬
      ¬$1Ø BET)"
```

```
5280 PRINT"↓IF NO DIE SHOWS A 5 YOU ¬
      ¬LOSE YOUR BET.↓"
5295 GOSUB10100
5300 PRINT"ĥIT SOUNDS LIKE THE ODDS ARE ¬
      ¬ON YOUR"
5310 PRINT"↓SIDE, DOESN'T IT? PLAY IT A ¬
      ¬FEW TIMES"
5320 PRINT"↓TO SEE IF YOU TEND TO WIN ¬
      ¬OR LOSE."
5330 PRINT"↓CAN YOU DETERMINE THE EXACT ¬
      ¬ODDS"
5340 PRINT"↓OF WINNING?↓"
5380 XX$="r HIT SPACE TO BEGIN r̂":
      ¬GOSUB10100
5999 RETURN
6000 PRINT"ĥ";:REM DRAW BOARD
6005 PRINT"$$$$$$$$$$                    ¬
      ¬$$$$$$$$$"
6010 PRINT"r   MONEY  r̂                    ¬
      ¬r  TURNS  r̂"
6020 PRINT "O########P                  ¬
      ¬O#######P"
6030 PRINT "%$       '  THRICE DICE   % ¬
      ¬      '"
6040 PRINT "L$$$$$$$$:  EEEEEEEEEEE   ¬
      ¬L$$$$$$$:"
6050 PRINT "((((((((((((((((((((((((((((
      ¬((((((("
6100 PRINT"h↓↓↓→→_______←←←←←←←";CASH
6200 PRINT"h↓↓↓";LEFT$(ZR$,28);TURN
6999 RETURN
8000 PRINT"h↓↓↓→";CASH;"h↓↓↓→$"
8010 PRINTBL$;"rCONGRATULATIONS !!!"
8020 PRINT"↓rYOU BROKE THE BANK."
8099 END
9000 PRINTBL$;"TOO BAD, YOU DON'T HAVE ¬
      ¬ENOUGH MONEY"
9010 PRINT"↓TO MEET THE MINIMUM BET."
9020 PRINT"↓↓PLEASE COME BACK TOMORROW ¬
      ¬WITH"
9030 PRINT"↓rMORE MONEY."
9099 END
10100 IFXX$=""THENXX$="r HIT SPACE TO ¬
      ¬CONTINUE r̂" : REM GET 1 CHARACTER
```

```
 10120 IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
 10130 GETXA$:IFXA$>""THEN10130:REM ¬
       ¬CLEAR BUFFER
 10140 GETXA$:IFXA$=""THEN10140
 10150 XA=VAL(XA$)
 10199 XX$="":RETURN
 10200 IFXP$=""THENXP$="?" : REM SET ¬
       ¬DEFAULT PROMPT - INPUT WITH PROMPT
 10220 GETXA$:IFXA$<>""THEN10220:
       ¬REM CLEAR BUFFER
 10250 XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
       ¬4):REM SET UP FOR PROMPT
 10260 PRINTXQ$;XB$;:REM PRINTS THE ¬
       ¬QUESTION FOLLOWED WITH PROPOSED ¬
       ¬ANSWER
 10270 INPUTXA$
 10280 XA=VAL(XA$)
 10299 XP$="":XB$="":XQ$="":RETURN
 20000 IFXX=0THENXX=10:REM START COLUMN ¬
       ¬- DICE
 20011 IFYY=0THENYY=10:REM START ROW
 20015 XC$="h"+LEFT$(ZD$,YY-1):REM ¬
       ¬STARTING ROW
 20020 PRINTXC$;:REM GO TO STARTING ROW
 20025 PRINTTAB(XX);",""";"
 20026 PRINTTAB(XX);"r!   r̂!"
 20027 PRINTTAB(XX);"r!   r̂!"
 20028 PRINTTAB(XX);"r!   r̂!"
 20029 PRINTTAB(XX);"<r"""r̂>"
 20030 PRINTXC$;TAB(XX+1);"↓";:REM READY ¬
       ¬FOR FIRST SPOT ON DIE
 20033 XD=FNR(6) : REM PICK A RANDOM ¬
       ¬NUMBER (XD)
 20035 ONXDGOTO20040,20050,20060,20070,
       ¬20080,20090
 20040 PRINT"r↓→Q":GOTO20099
 20050 PRINT"rQ↓↓→Q":GOTO20099
 20060 PRINT"rQ↓Q↓Q":GOTO20099
 20070 PRINT"rQ→Q←←←↓↓Q→Q":GOTO20099
 20080 PRINT"rQ→Q↓←←Q↓←←Q→Q":GOTO20099
 20090 PRINT"rQ→Q↓←Q←←←Q↓←Q→Q"
 20099 XX=0:YY=0:XC$="":RETURN:REM ¬
       ¬XD=THE NUMBER FOR THIS ROLL
READY.
```

These two games should just whet your appetite, as well as provide you with some of the basic tools for creating some of your own gambling programs. Here's more grist for your mill:

Albert H. Morehead, Richard L. Frey, and Geoffrey Mott-Smith. *The New Complete Hoyle: The Official Rules of All Popular Games of Skill and Chance with the Most Authoritative Advice on Winning Play* (Garden City: Doubleday, 1964).

Charles H. Goren. *Hoyle Encyclopedia of Games: With Official Rules and Pointers on Play Including the Latest Laws of Contract Bridge*. (Greystone Press, 1961.)

Human beings have been gambling since the cavemen played games of chance with stones. For a partial history of games of chance, see *A History of Playing Cards* by Roger Tilley (New York: 1973).

And last but not least—people have been cheating for as long as they've been playing games. For a personal recollection of a life of cardsharping, read *Marked Cards and Loaded Dice*, by Frank Garcia. Of course, we're trusting you to stay honest. Your PET playing companion is a Straight Arrow.

Chapter 5

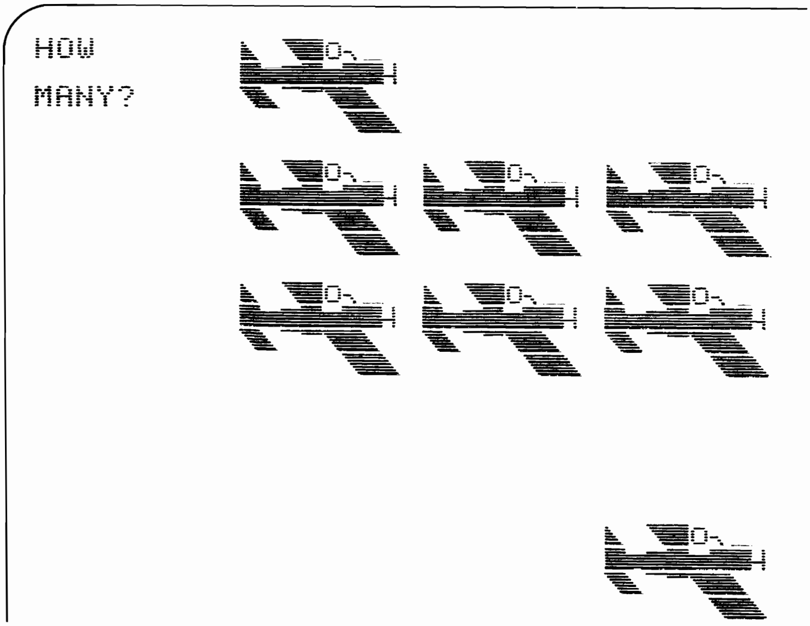
Language and Counting Skills Games

How Many?

by Mac Oglesby

Let the Red Baron help you sharpen your counting skills!

Planes flash onto your screen. Their number and locations change with each try. Count *How Many* and type your answer into the computer. If you're right, PET will reward you with a graphics display. Enjoy it, and go on to your next turn by pressing the SPACE bar. If you counted wrong, PET will tell you to "try again."



```
HOW

MANY?
```

How Many? is designed to be simple and sweet, for enjoyable learning and/or teaching.

Level A: See how quickly and accurately you can count. Try counting in groups, rows, and combinations; challenge yourself to greater speed while staying accurate.

```
100 REM  ***HOW MANY?***
110 REM
120 REM  (C)  MAC OGLESBY
130 REM
140 REM  COPYRIGHT 198Ø BY MAC OGLESBY
150 REM
160 REM  LAST REVISION:  3/29/8Ø 17:ØØ
170 REM
1ØØØ REM ***INITIALIZATION
1Ø1Ø POKE 59468,12:REM GRAPHIC MODE
1Ø2Ø X=RND(-TI):REM RANDOMIZE
1Ø3Ø DIM D(2Ø)
12ØØ DN$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
13ØØ RT$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→→→→"
14ØØ FOR J=1 TO 9:Z(J)=J:NEXT
15ØØ PL$="r ↑←^→r̂^r r̂Wr̂I$↓←←←←←←r7# 7  ¬
      ¬r̂3↓←←←←←←←←^r^r̂#7^r ^r̂↓←←^r ^r̂"
19ØØ FOR J=1 TO 2ØØ:NEXT
2ØØØ FOR J=9 TO 1 STEP -1
2Ø1Ø :PRINT "ĥ";
2Ø2Ø :X=1+INT(RND(1)*J):N=Z(X)
2Ø3Ø :Q$="hHOW↓↓←←←MANY?  "
21ØØ :FOR K=1 TO N
211Ø ::Y=2+INT(RND(1)*19)
215Ø ::R=INT((Y-1)/4):C=Y-R*4-1
216Ø ::IF D(Y)=Ø THEN D(Y)=1:GOTO 22ØØ
217Ø ::GOTO 211Ø
22ØØ ::PRINT "h";LEFT$(DN$,1+R*5);LEFT$(
      ¬RT$,1+C*9);PL$
221Ø ::FOR L=1 TO 2ØØ:NEXT
222Ø :NEXT
23ØØ :PRINT Q$;
231Ø :GOSUB 1ØØØØ
233Ø :PRINT A$;:FOR L=1 TO 4ØØ:NEXT
```

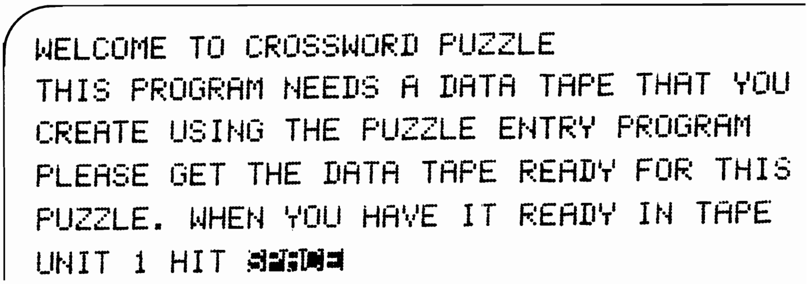
```
 2400 :IF VAL(A$)<>N THEN Q$="hTRY↓↓←←←AG
        ¬AIN   ←":GOTO 2300
 2500 :PRINT "hrTHAT'S↓↓←←←←←←RIGHT!"
 2510 :FOR L=1 TO 400:NEXT
 2600 :T9=Z(J):Z(J)=Z(X):Z(X)=T9
 2610 :GOSUB 3000
 2700 :FOR K=1 TO 100:NEXT
 2710 :FOR K=1 TO 20:D(K)=0:NEXT
 2800 NEXT
 2810 PRINT "ĥPRESS  RETURN  FOR MORE";
 2820 GOSUB 10000
 2830 IF ASC(A$)=13 THEN RUN
 2850 PRINT "ĥBYE FOR NOW..."
 2860 END
 3000 REM ***HAPPY FACES
 3050 FOR K=1 TO 200:NEXT
 3100 PRINT "ĥ  ";
 3200 F$=". .↓←←+↓←←J@K ↑↑":D$="↓↓↓↓←←←←"
        ¬:L$="←←←←←←←←":U$="↑↑↑↑←←←←"
 3210 R=9:D=5:L=8:U=4
 3220 FOR I=1 TO 3
 3230 :FOR K=1 TO R:PRINT F$;:NEXT
 3240 :FOR K=1 TO D:PRINT D$;F$;:NEXT
 3250 :FOR K=1 TO L:PRINT L$;F$;:NEXT
 3260 :FOR K=1 TO U:PRINT U$;F$;:NEXT
 3270 :R=R-2:D=D-2:L=L-2:U=U-2
 3280 NEXT
 3300 FOR K=1 TO 100:NEXT
 3500 RETURN
 10000 REM GET
 10100 GET A$:IF A$<>"" THEN 10100
 10200 GET A$:IF A$="" THEN 10200
 10300 RETURN
READY.
```

Crossword Puzzle
(Puzzlebox and Puzzle Entry)

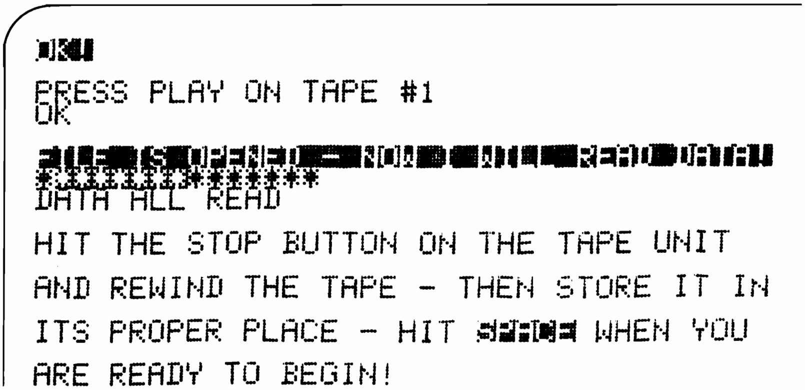
by Len Lindsay

You can create personalized crossword puzzles for your own enjoyment and for friends and/or students with your versatile PET. Two ᵖʳograms go together to make up your *Crossword Puzzle.*

Puzzle Entry does all the busy work for you of assigning numbers and locations for your words in a 7 x 12 space area. You provide the words and the clues. Create directly on the screen, or figure out your puzzle on paper first and just type it in. Use the keypad to move the cursor as you enter the letters where you want them. Use DEL to delete and 5 to stop. Here's how you start:



```
WELCOME TO CROSSWORD PUZZLE
THIS PROGRAM NEEDS A DATA TAPE THAT YOU
CREATE USING THE PUZZLE ENTRY PROGRAM
PLEASE GET THE DATA TAPE READY FOR THIS
PUZZLE. WHEN YOU HAVE IT READY IN TAPE
UNIT 1 HIT RETURN
```



```
[illegible]
PRESS PLAY ON TAPE #1
OK
[illegible]
DATA ALL READ
HIT THE STOP BUTTON ON THE TAPE UNIT
AND REWIND THE TAPE - THEN STORE IT IN
ITS PROPER PLACE - HIT RETURN WHEN YOU
ARE READY TO BEGIN!
```

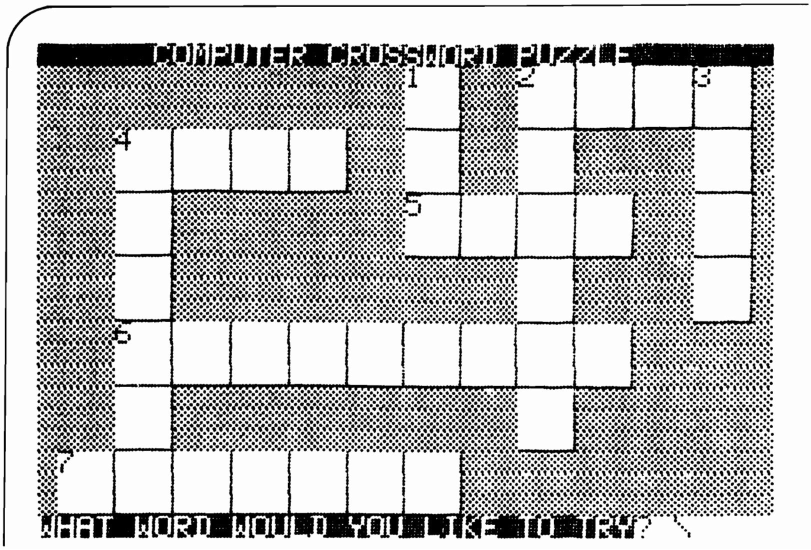
When you've added the words you want, you're ready to type in the clues or "hints." PET will ask you:

WHICH HINT NUMBER DO YOU WANT TO DO?

You type in 2. PET has assigned 2 to your word, which is FAST. You type in your hint, which is: NOT SLOW. PET asks for the next hint number. When you're finished with all of your words, type Q for QUIT.

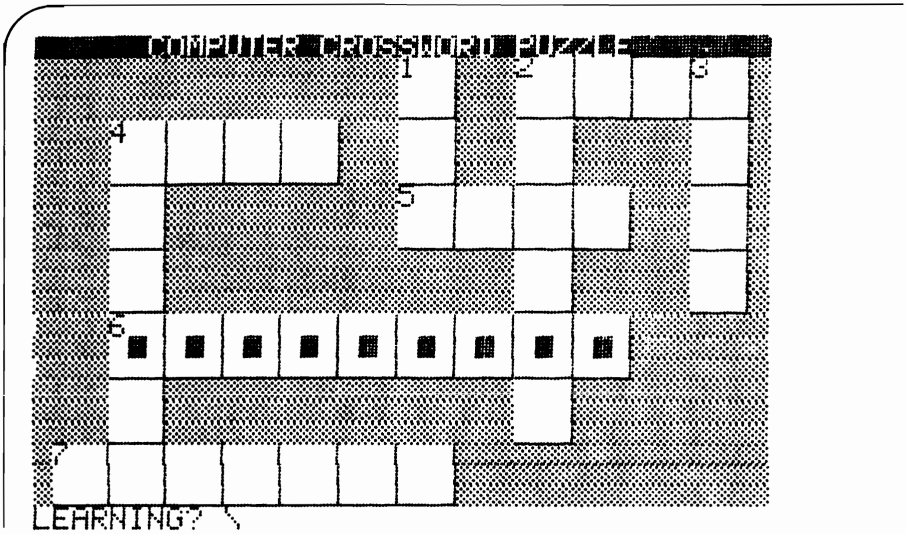
PET now asks you if you're ready to SAVE all the information about your puzzle, the words, and your hints, on a DATA TAPE. The DATA TAPE is simply a cassette tape you place in your PET tape recorder, or a disk, if you're lucky enough to have a disk-loading machine. PET writes the Data Tape for you. Label the tape, and you're ready to use it with *Puzzle Box* to display your finished crossword puzzle on the screen.

Puzzle Box displays your puzzle on the screen and gives hints to the player trying to guess your words. The player chooses the spaces he'd like to fill in that correspond to a word. PET prints the hint for him, and the boxes in the puzzle that contain the unknown word light up. If he guesses correctly, the word is filled in and he continues to the next guess.

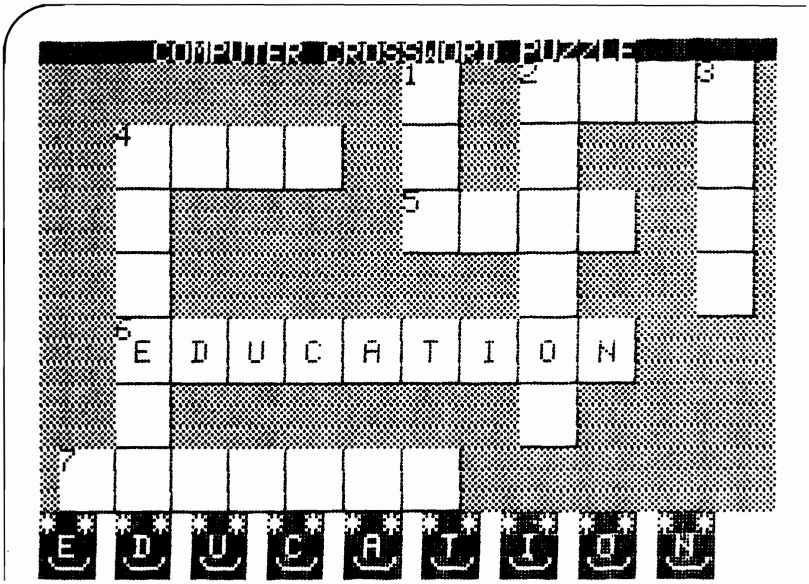


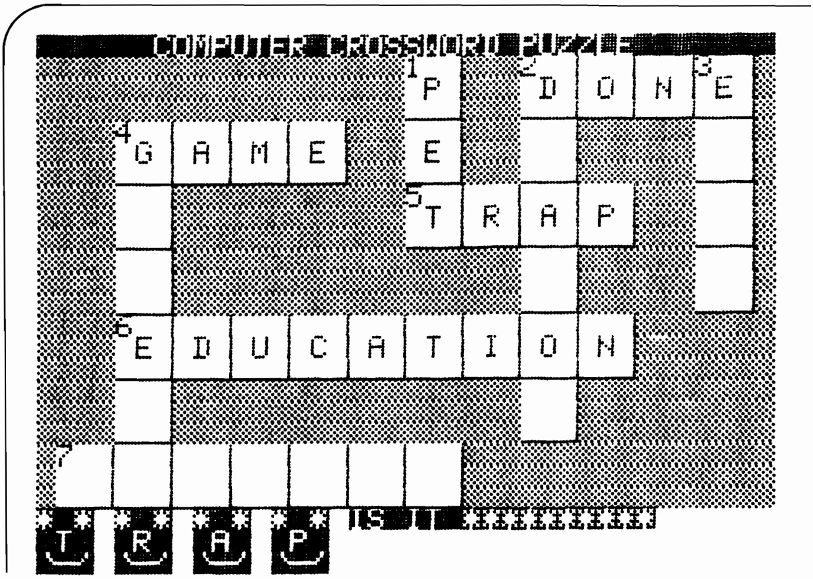
COMPUTER CROSSWORD PUZZLE

WHAT WORD WOULD YOU LIKE TO TRY?


COMPUTER CROSSWORD PUZZLE
1
2
3
4
5
6
7

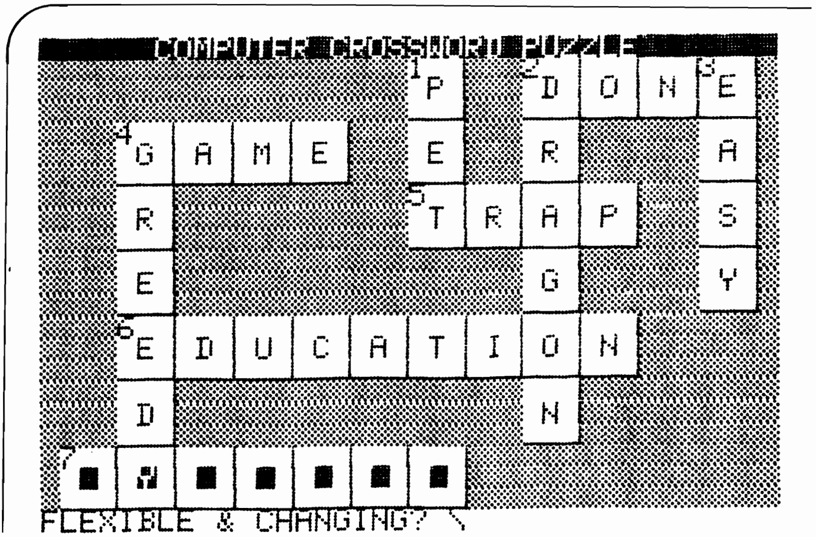
```
LEARNING? \
```


COMPUTER CROSSWORD PUZZLE
1
2
3
4
5
6
E D U C A T I O N
7
E D U C A T I O N



COMPUTER CROSSWORD PUZZLE

IS



COMPUTER CROSSWORD PUZZLE

FLEXIBLE & CHANGING? \

Crossword Puzzle is a fun way to learn spelling and vocabulary words. The advantage of the two-program method Len devised is that teachers and parents can make up specialized puzzle tapes for the lucky player they've chosen to entertain and instruct with PET.

Level B,C: Fine for all ages—very young children can also learn and enjoy with a little help from their friends, junior or adult.

```
Ø REM WORKS ON PET 2ØØ1-8, NEW PET/CBM,
    ¬ & BASIC 4.Ø
1 REM***PUZZLEBOX - A CROSSWORD PUZZLE ¬
    ¬PROGRAM
2 REM***ORIGINAL PROGRAM
3 REM***(C) 198Ø
4 REM***LEN LINDSAY
5 REM***Ø1-3Ø-8Ø
6 REM*** CHANGE ONLY TWO LINES AS ¬
    ¬INDICATED FOR DISK DATA FILE ¬
    ¬CREATION
8 REM***REQUIRES DATA TAPE/DISK CREATED ¬
    ¬BY PUZZLE ENTRY***
9 REM***USES MAIN SUBROUTINES 1Ø1ØØ,
    ¬ 1Ø2ØØ
1Ø POKE59468,12
15 XQ=RND(-TI):XQ=Ø:REM RANDOM SEED
2Ø PRINT"ĥ";
3Ø NC=12:NR=7:DIM PZ$(NC,NR):REM MAX ¬
    ¬PUZZLE ARRAY
31 DIM N(NC,NR):REM NUMBERS FOR PUZZLE
32 MW=2Ø:DIM W$(1,MW):REM MAX WORDS
33 DIMH$(1,MW):REM MAX HINTS
35 DIM WD(NC):REM WORD DOWN FLAG
5Ø ZS$="                                       ¬
    ¬        ":REM 39 SPACE
52 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":
    ¬REM 24 DOWN
53 REM
54 ZZ$="
    ¬":REM 4Ø DELETE
56 ZL$="←←←←←←←←←←←←←←←←←←←←":REM 2Ø ¬
    ¬LEFT
6Ø RM$="h"+ZD$+ZS$+"h"+ZD$+ZZ$+ZZ$
62 B$="&&&←←←↓&&&←←←↓&&&↑↑"
64 C$="r___←←←↓_→_←←←↓___↑↑"
69 SM$="r* *←←←↓ > ←←←↓J@Kr̂↑↑ "
9Ø GOSUB5ØØØ:REM INSTRUCTIONS
1ØØ GOSUB7ØØØ:REM READ DATA TAPE
11Ø GOSUB6ØØØ:REM DRAW PUZZLE BOXES
12Ø GOSUB63ØØ:REM FILL IN BOXES
2ØØ PRINTRM$;
```

```
210 PRINT"r̲WHAT WORD WOULD YOU LIKE TO ¬
      ¬TRYr̂";
215 GOSUB10200
220 IFXA=0THEN200
230 IFXA<1ORXA>NWTHENPRINTRM$;"OUT OF ¬
      ¬RANGE - WHAT WORD NEXT";:GOTO215
235 WN=XA:REM WORD NUMBER
240 GOSUB6500:REM CHECK IF DONE ALREADY ¬
      ¬AND LIGHT UP IF NOT
250 IFWC=1THEN215:REM WORD PICKED IS ¬
      ¬COMPLETE
260 PRINTRM$;H$(WD,WN):REM PRINT HINT
270 GOSUB10200
280 IFXA$="?̲"THEN260
290 IFXA$<>W$(WD,WN)THENPRINTRM$;"THAT ¬
      ¬IS NOT IT ...":GOSUB8200:GOTO210
300 PRINTRM$;"r̲********** THAT IS IT ¬
      ¬**********"
301 GOSUB8400:REM PUT WORD INTO PUZZLE
302 PRINTRM$;
304 FORQ=1TOLEN(XA$)
305 IFQ>9THEN309:REM LIMIT TO LINE FOR ¬
      ¬FACES
306 PRINT"r̲* *←←←↓ ";MID$(XA$,Q,
      ¬1);" ←←←↓J̲@̲K̲r̂↑↑ ";
308 :XP=1:GOSUB10400:REM PAUSE
309 NEXTQ
320 GOSUB9000:REM SEE IF PUZZLE DONE
330 IFPQ=0THEN200:REM NEXT WORD
340 PRINTRM$;"r̲THE PUZZLE IS NOW ¬
      ¬COMPLETE→";
350 PRINTSM$;SM$;SM$;"↑"
360 END
4999 END
5000 PRINT"ĥWELCOME TO CROSSWORD PUZZLE"
5010 PRINT"↓THIS PROGRAM NEEDS A DATA ¬
      ¬TAPE THAT YOU"
5020 PRINT"↓CREATE USING THE PUZZLE ¬
      ¬ENTRY PROGRAM."
5030 PRINT"↓PLEASE GET THE DATA TAPE ¬
      ¬READY FOR THIS"
```

```
5Ø4Ø PRINT"↓PUZZLE. WHEN YOU HAVE IT ¬
      ¬READY IN TAPE"
5Ø5Ø PRINT"↓UNIT 1 HIT rSPACE"
5Ø6Ø GOSUB1Ø13Ø
5Ø99 RETURN
6ØØØ REM*** DRAW PUZZLE BOXES ***
6Ø1Ø A=12
6Ø2Ø D=7
6Ø6Ø PRINT"ĥ↓";
6Ø7Ø FORX1=1TOD
6Ø8Ø :FORX2=1TO2
61ØØ ::FORX3=1TOA
611Ø :::PRINT"!  ";
612Ø ::NEXTX3
613Ø ::PRINT"!&"
614Ø :NEXTX2
616Ø :FORX3=1TOA
617Ø ::PRINT":$$";
618Ø :NEXTX3
619Ø :PRINT":&"
62ØØ NEXTX1
621Ø PRINT"hr      COMPUTER CROSSWORD ¬
      ¬PUZZLE         "
622Ø FORX=1TONR*3
623Ø :PRINT"&"
624Ø NEXTX
6299 RETURN
63ØØ PRINT"h↓";:REM FILL IN BOXES
631Ø FORY=1TONR
6315 PRINT"→";
632Ø :FORX=1TONC
633Ø ::IFPZ$(X,Y)="."THENPRINTB$;:
      ¬GOTO635Ø
6335 ::N=N(X,Y)
634Ø ::IFN=ØTHENPRINT"→→→";:GOTO635Ø
6345 ::GOSUB64ØØ:REM N TO NS$
6347 ::PRINTNS$;"!";
635Ø :NEXTX
636Ø :PRINT"↓↓"
637Ø NEXTY
6399 RETURN
64ØØ N$=STR$(N):REM NUMBER TO STRING
641Ø Q=LEN(N$)
```

```
6420 NS$=MID$(N$+" ",2,2)
6499 RETURN
6500 PRINT"h̲↓↓→→";:REM CHECK IF WORD ¬
       ¬DONE ALREADY
6510 GOSUB8ØØØ:REM FIND START ROW AND ¬
       ¬COLUMN OF WORD
6520 GOSUB81ØØ:REM FIND WORD DIRECTION
6530 GOSUB82ØØ:REM LIGHT UP THE WORDS ¬
       ¬SPACES & CHECK IF COMPLETE
6540 IFWC=1THENPRINTRM$;"WORD IS ¬
       ¬COMPLETE-TRY ANOTHER";:GOSUB82ØØ
6599 RETURN
7ØØØ PRINT"ĥ↓r̲OK!":REM READ DATA TAPE
7Ø1Ø OPEN1:REM OPEN TAPE FOR READ
7Ø11 REM>>>FOR 2Ø4Ø DISK>>> OPEN 1,8,2,
       ¬"Ø:PUZZLE.DATA,SEQ,READ":REM USE ¬
       ¬NAME
7Ø2Ø PRINT"↓r̲FILE IS OPENED - NOW I ¬
       ¬WILL READ DATA!"
7Ø3Ø INPUT#1,NC
7Ø8Ø INPUT#1,NR
7Ø9Ø INPUT#1,NW:PRINT"*";
71ØØ FORR=1TONR
711Ø :FORC=1TONC
712Ø ::INPUT#1,PZ$(C,R)
713Ø ::INPUT#1,N(C,R)
714Ø :NEXTC
715Ø :PRINT"r̲*r̂";
716Ø NEXTR
717Ø FORC=1TONW
718Ø :INPUT#1,W$(Ø,C)
719Ø :INPUT#1,W$(1,C)
72ØØ :INPUT#1,H$(Ø,C)
721Ø :INPUT#1,H$(1,C)
722Ø :PRINT"*";
723Ø NEXTC
724Ø CLOSE1
725Ø PRINT
726Ø PRINT"DATA ALL READ"
727Ø PRINT"↓HIT THE STOP BUTTON ON THE ¬
       ¬TAPE UNIT"
728Ø PRINT"↓AND REWIND THE TAPE. PUT ¬
       ¬TAPE BACK IN"
```

```
729Ø PRINT"↓ITS PROPER PLACE. HIT ¬
      ¬r̲SPACEr̂ WHEN YOU"
73ØØ PRINT"↓ARE READY TO START."
731Ø GOSUB1Ø13Ø
7399 RETURN
8ØØØ REM FIND START ROW AND COLUMN OF ¬
      ¬WORD
8Ø1Ø FORY=1TONR
8Ø2Ø :FORX=1TONC
8Ø3Ø ::IFN(X,Y)=WNTHENPX=X:PY=Y:X=NC:
      ¬Y=NR
8Ø4Ø :NEXTX
8Ø5Ø NEXTY
8Ø99 RETURN
81ØØ REM FIND WORD DIRECTION
811Ø WD=Ø:REM INIT
812Ø IFLEN(W$(1,WN))>1THENWD=1
813Ø IFWD=ØTHEN8199:REM DIR FOUND
814Ø IFLEN(W$(Ø,WN))=1THEN8199:REM DIR ¬
      ¬FOUND
815Ø PRINTRM$;"WHICH WORD? r̲Ar̂CROSS OR ¬
      ¬r̲Dr̂OWN?"
816Ø GOSUB1Ø13Ø
817Ø IFXA$="A"THENWD=Ø:GOTO8199
818Ø IFXA$="D"THENWD=1:GOTO8199
819Ø GOTO816Ø
8199 RETURN
82ØØ WC=1:REM WORD COMPLETE FLAG ON ¬
      ¬INIT - CHECK IF COMPLETE - CHANGE ¬
      ¬SPOT
821Ø QX=PX:QY=PY:REM INIT
822Ø CL=32727+3*QX+4Ø*(QY*3)
823Ø Q=PEEK(CL)
824Ø IFQ=1Ø2ORQX>NCORQY>NRTHEN8299:
      ¬REM WORD DONE
825Ø IFQ=32THENWC=Ø:REM WORD NOT ¬
      ¬COMPLETE YET
826Ø IFQ<129THENPOKECL,Q+128:REM LIGHT ¬
      ¬UP SPOT
8265 IFQ>128THENPOKECL,Q-128:REM ¬
      ¬UNLIGHT SPOT
827Ø QY=QY+(WD*1):QX=QX+((1-WD)*1):
      ¬GOTO822Ø
8299 RETURN
```

```
 8400 REM PUT WORD INTO PUZZLE
 8410 Q=0:QX=PX:QY=PY:REM INIT
 8420 FORQ=1TOLEN(W$(WD,WN))
 8430 :CL=32727+3*QX+40*(QY*3)
 8440 :POKECL,ASC(MID$(W$(WD,WN),Q,1))-64
 8450 :QY=QY+(WD*1):QX=QX+((1-WD)*1)
 8460 NEXTQ
 8499 RETURN
 9000 PQ=1:REM INIT-TEST IF PUZZLE IS ¬
       ¬COMPLETE
 9010 FORY=1TO7
 9020 :FORX=1TO12
 9030 ::CL=32727+3*X+40*(Y*3)
 9040 ::IFPEEK(CL)=32THENPQ=0:X=12:Y=7
 9050 :NEXTX
 9060 NEXTY
 9099 RETURN
 10100 IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
       ¬CONTINUE r̂" : REM GET 1 CHARACTER
 10120 IFXX$<>" "THENPRINTXX$; : REM ¬
       ¬PRINT MESSAGE
 10130 GETXA$:IFXA$>""THEN10130:REM ¬
       ¬CLEAR BUFFER
 10140 GETXA$:IFXA$=""THEN10140
 10150 XA=VAL(XA$)
 10199 XX$="":RETURN
 10200 IFXP$=""THENXP$="?̲" : REM SET ¬
       ¬DEFAULT PROMPT - INPUT WITH PROMPT
 10220 GETXA$:IFXA$<>""THEN10220:
       ¬REM CLEAR BUFFER
 10250 XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
       ¬4):REM SET UP FOR PROMPT
 10260 PRINTXQ$;XB$;:REM PRINTS THE ¬
       ¬QUESTION FOLLOWED WITH PROPOSED ¬
       ¬ANSWER
 10270 INPUTXA$
 10280 XA=VAL(XA$)
 10299 XP$="":XB$="":XQ$="":RETURN
 10400 IFXP=0THENXP=10:REM PAUSE
 10420 XJ=TI+60*XP
 10430 IFTI<XJTHEN10430
 10499 XJ=0:XP=0:RETURN
READY.
```

```
0 REM WORKS ON PET 2001-8, NEW PET/CBM ¬
      ¬& BASIC 4.0
1 REM***PUZZLE ENTRY
2 REM***ORIGINAL PROGRAM
3 REM***(C) 1980
4 REM***LEN LINDSAY
5 REM***01/28/80
9 REM***USES MAIN SUBROUTINES 10100,
      ¬ 10200
10 POKE59468,12:REM GRAPHICS
15 XQ=RND(-TI):XQ=0:REM SEED RANDOM
20 PRINT"ĥr̲↓ONE MOMENT PLEASE"
30 NC=12:NR=7:DIM PZ$(NC,NR):REM ¬
      ¬MAXIMUM PUZZLE ARRAY
31 DIMN(NC,NR):REM NUMBERS FOR PUZZLE
32 MW=20:DIMW$(1,MW):REM MAX WORDS
33 DIMH$(1,MW):REM MAX HINTS
35 DIM WD(NC):REM WORD DOWN FLAG
51 REM
52 ZZ$="
      ¬":REM 40 DELETE
54 ZL$="←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←
      ¬←←←←←←←←":REM 40 LEFT
56 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓":
      ¬REM 23DOWN
60 CR$=CHR$(13):REM [RETURN]
66 ZV=32768:REM VIDEO START
80 GOSUB3100:GOSUB3200:GOSUB3300:
      ¬REM INIT ARRAYS
85 GOSUB6000:REM DRAW BOARD
90 GOSUB5000:REM INSTRUCTIONS
200 PRINT"h̲";:REM READY TO START
210 X=1:Y=1:REM INIT CURSOR LOCATION
220 CL=40*(Y-1)+(X-1)+ZV:REM CURRENT ¬
      ¬SCREEN LOCATION
230 POKECL,PEEK(CL)+128:REM HIGHLIGHT ¬
      ¬CURRENT LOCATION
240 GOSUB10140:REM GET
250 POKECL,PEEK(CL)-128:REM RETURN ¬
      ¬CURRENT SCREEN LOCATION TO NORMAL
260 IFXA$>="A"ANDXA$<="Z"THENX=X+1:
      ¬IFX<=NC+1THENPRINTXA$;:GOTO285:
      ¬REM UPDATE
```

```
262 IFXA$=CHR$(2Ø)THENPRINT".←";:
      ¬REM DELETE
265 IFXA=ØTHENGOTO285:REM ILLEGAL ¬
      ¬RESPONSE
27Ø ONXAGOSUB31Ø,32Ø,33Ø,34Ø,35Ø,36Ø,
      ¬37Ø,38Ø,39Ø
28Ø IFXA=5THENPRINT"h"+LEFT$(ZD$,
      ¬NR)+"rFINISHED?r̂h":GOTO4ØØ
285 IFX>NCTHENX=NC:PRINT"←";
286 IFY>NRTHENY=NR:PRINT"↑";
287 IFY<1THENY=1
288 IFX<1THENX=1:IFY>1THENPRINT"→";
29Ø GOTO22Ø:REM NEXT
3ØØ REM CORRECT POSITION VIA NUMERIC ¬
      ¬INPUT - 5 MEANS END
31Ø PRINT"↓←";:X=X-1:Y=Y+1:RETURN
32Ø PRINT"↓";:Y=Y+1:RETURN
33Ø PRINT"↓→";:X=X+1:Y=Y+1:RETURN
34Ø PRINT"←";:X=X-1:RETURN
35Ø RETURN
36Ø PRINT"→";:X=X+1:RETURN
37Ø PRINT"↑←";:X=X-1:Y=Y-1:RETURN
38Ø PRINT"↑";:Y=Y-1:RETURN
39Ø PRINT"↑→";:X=X+1:Y=Y-1:RETURN
4ØØ GOSUB1Ø13Ø:REM GET - SEE IF DONE OR ¬
      ¬NOT
41Ø IFXA$="N"THENPRINT"h"+LEFT$(ZD$,
      ¬NR)+"&&&&&&&&&h";:GOTO21Ø:
      ¬REM NOT DONE
42Ø IFXA$<>"Y"THENGOTO4ØØ
45Ø GOSUB1ØØØ:REM ASSIGN PUZZLE ARRAY
46Ø GOSUB3ØØØ:REM ASSIGN PUZZLE NUMBERS ¬
      ¬& WORDS
47Ø GOSUB4ØØØ:REM ASSIGN PUZZLE HINTS
48Ø PRINT"ĥREADY TO SAVE PUZZLE DATA ON ¬
      ¬TAPE?":GOSUB1Ø13Ø
49Ø IFXA$="Y"THEN2ØØØ
5ØØ PRINT"↓WANT TO CHANGE YOUR PUZZLE?":
      ¬GOSUB1Ø13Ø
51Ø IFXA$<>"Y"THEN52Ø
511 PRINT"↓IF YOU CHANGE YOUR PUZZLE"
512 PRINT"↓YOU WILL THEN HAVE TO REDO"
513 PRINT"↓ALL OF YOUR HINTS TOO!"
```

```
514 PRINT"↓THE WORDS IN THE PUZZLE WILL ¬
      ¬REMAIN,"
515 PRINT"↓BUT THE HINTS WILL BE GONE."
516 PRINT"↓r̲DO YOU REALLY WANT TO REDO ¬
      ¬THE PUZZLE?":GOSUB1Ø13Ø
517 IFXA$<>"Y"THEN52Ø
518 GOSUB34ØØ:REM INIT
519 GOTO85
52Ø PRINT"↓WANT TO UPDATE YOUR HINTS?":
      ¬GOSUB1Ø13Ø
53Ø IFXA$="Y"THEN47Ø
54Ø PRINT"↓THEN I DON'T KNOW WHAT YOU ¬
      ¬WANT"
55Ø END
1ØØØ OPEN3,3:REM OPEN SCREEN
1Ø1Ø PRINT"h̲";
1Ø2Ø FORY=1TONR:REM EACH ROW
1Ø3Ø :FORX=1TONC:REM EACH COLUMN
1Ø4Ø ::GET#3,PZ$(X,Y):REM GET CHARACTER
1Ø45 ::PRINT"←r̲"+PZ$(X,Y);
1Ø5Ø :NEXTX
1Ø6Ø :PRINT
1Ø7Ø NEXTY
1Ø9Ø CLOSE3
11ØØ PRINT"&̲&̲&̲&̲&̲&̲&̲&̲&̲"
111Ø PRINT"r̲ONE MOMENT PLEASE!"
1199 RETURN
2ØØØ PRINT"ĥ";:REM SAVE TO TAPE
2Ø1Ø PRINT"HIT r̲SPACEr̂ WHEN YOU HAVE A ¬
      ¬DATA TAPE"
2Ø2Ø PRINT"↓READY IN TAPE UNIT 1"
2Ø3Ø GOSUB1Ø13Ø
2Ø4Ø PRINT"ĥ↓r̲OK!"
2Ø5Ø OPEN1,1,1,"PUZZLE.DATA":REM OPEN ¬
      ¬TAPE FOR A WRITE
2Ø51 REM >>>>> FOR 2Ø4Ø DISK >>>>> ¬
      ¬OPEN8,8,15:PRINT#8,"SØ:PUZZLE.DATA
      ¬":CLOSE8
2Ø52 REM >>>>> THE ABOVE LINE SCRATCHES ¬
      ¬THE PREVIOUS FILE
2Ø53 REM >>>>> TO SAVE MULTIPLE PUZZLE ¬
      ¬DATA USE DIFFERENT NAMES
```

```
2Ø54 REM >>>>> AND MODIFY THE CROSSWORD ¬
       ¬PUZZLE PROGRAM TO MATCH
2Ø55 REM >>>>> OPEN 1,8,2,"Ø:PUZZLE.DATA
       ¬,SEQ,WRITE": REM FOR 2Ø4Ø DISK
2Ø6Ø PRINT"↓r̲FILE OPENED - DATA NOW ¬
       ¬BEING WRITTEN"
2Ø7Ø PRINT#1,NC;CR$;
2Ø8Ø PRINT#1,NR;CR$;
2Ø85 PRINT#1,NW;CR$;:PRINT"*";
2Ø9Ø FORR=1TONR:REM EACH ROW
21ØØ :FORC=1TONC:REM EACH COLUMN
211Ø ::PRINT#1,PZ$(C,R);CR$;
2115 ::PRINT#1,N(C,R);CR$;
212Ø :NEXTC
213Ø :PRINT"r̲*r̂";
214Ø NEXTR
221Ø FORC=1TONW
222Ø :PRINT#1,W$(Ø,C);CR$;
223Ø :PRINT#1,W$(1,C);CR$;
224Ø :PRINT#1,H$(Ø,C);CR$;
225Ø :PRINT#1,H$(1,C);CR$;
2255 :PRINT"*";
226Ø NEXTC
227Ø CLOSE1
228Ø PRINT
229Ø PRINT"↓r̲YOUR PUZZLE DATA IS NOW ON ¬
       ¬TAPE"
23ØØ PRINT"↓r̲LABEL YOUR TAPE APPROPRIATE
       ¬LY"
231Ø PRINT"↓DO YOU WANT ANOTHER COPY ON ¬
       ¬TAPE?"
232Ø GOSUB1Ø13Ø
233Ø IFXA$="Y"THEN2ØØØ
2399 END
3ØØØ GOSUB31ØØ:REM CLEAR WORD ARRAY ¬
       ¬FIRST
3ØØ1 GOSUB34ØØ:REM INIT NUMBER ARRAY
3ØØ2 NM=Ø:REM INIT NUMBER
3ØØ5 FORR=1TONR:REM EACH ROW
3Ø1Ø :WA=Ø:REM INIT ACROSS FLAG
3Ø2Ø :FORC=1TONC:REM EACH COLUMN
```

```
3Ø3Ø ::IFPZ$(C,R)="."THENWA=Ø:WD(C)=Ø:
      ¬GOTO3Ø7Ø:REM NEXT C
3Ø5Ø ::IFWA=ØANDWA<NCTHENGOSUB9ØØØ:
      ¬REM SEE IF ADD NUMBER AND WORD ¬
      ¬FOR ACROSS
3Ø6Ø ::IFWD(C)=ØANDWD(C)<NRTHENGOSUB91ØØ
      ¬:REM CHECK WORD DOWN & NUMBER
3Ø7Ø :NEXTC
3Ø8Ø NEXTR
3Ø9Ø NW=NM:REM NUMBER OF WORDS
3Ø99 RETURN
31ØØ FORY=1TOMW
311Ø :FORX=ØTO1
312Ø ::W$(X,Y)="."
313Ø :NEXTX
314Ø NEXTY
3199 RETURN
32ØØ FORY=1TOMW
321Ø :FORX=ØTO1
322Ø ::H$(X,Y)="."
323Ø :NEXTX
324Ø NEXTY
3299 RETURN
33ØØ FORY=1TONR
331Ø :FORX=1TONC
332Ø ::PZ$(X,Y)="."
334Ø :NEXTX
335Ø NEXTY
34ØØ FORY=1TONR
341Ø :FORX=1TONC
343Ø ::N(X,Y)=Ø
344Ø :NEXTX
345Ø NEXTY
3499 RETURN
4ØØØ PRINT"ĥWHICH HINT NUMBER DO YOU ¬
      ¬WANT TO DO?"
4ØØ1 PRINT"↓(OR TYPE Q FOR r̲Qr̂UIT)"
4Ø1Ø GOSUB1Ø2ØØ
4Ø15 IFXA$="Q"THEN4199
4Ø2Ø IFXA=ØTHEN4ØØØ:REM ERROR
4Ø21 IFXA>NWORXA<1THENPRINT"ĥOUT OF ¬
      ¬RANGE - WHICH NUMBER?":GOTO4ØØ1
```

```
4Ø23 HD=Ø:REM INIT
4Ø25 HN=XA
4Ø27 IFW$(1,HN)<>"."THENHD=1
4Ø28 IFW$(Ø,HN)<>"."ANDHD=1THEN4Ø3Ø
4Ø29 GOTO41ØØ
4Ø3Ø PRINT"↓r̲Af̂CROSS OR r̲Df̂OWN?"
4Ø4Ø GOSUB1Ø13Ø
4Ø5Ø IFXA$="A"THENHD=Ø:GOTO41ØØ
4Ø6Ø IFXA$="D"THENHD=1:GOTO41ØØ
4Ø7Ø GOTO4Ø4Ø:REM ERROR
41ØØ PRINT"ĥ";
41Ø5 PRINT"↓WORD";HN;"IS: ";W$(HD,HN)
411Ø PRINT"↓HINT IS:↓"
412Ø XP$=H$(HD,HN):GOSUB1Ø2ØØ
4125 IFLEN(XA$)>39THENPRINT"ĥTHE HINT ¬
      ¬MUST BE LESS THAN 4Ø CHARACTERS":
      ¬GOTO41Ø5
413Ø H$(HD,HN)=XA$
414Ø GOTO4ØØØ
4199 RETURN
5ØØØ PRINT"↓↓USE NUMERIC KEYPAD FOR ¬
      ¬CURSOR MOVEMENT"
5Ø1Ø PRINT
5Ø2Ø PRINT"7  8  9
5Ø3Ø PRINT" \ ^ /
5Ø4Ø PRINT"  \1/
5Ø5Ø PRINT"4^@*@@6
5Ø6Ø PRINT"  /1\
5Ø7Ø PRINT" / 1 \
5Ø8Ø PRINT"1  2  3
5Ø9Ø PRINT"↓ENTER LETTERS WHERE YOU ¬
      ¬WANT THEM IN
51ØØ PRINT"↓YOUR CROSSWORD PUZZLE. HIT ¬
      ¬r̲5f̂ TO STOP!
5199 RETURN
6ØØØ PRINT"ĥ";:REM DRAW PUZZLE AS IS NOW
6Ø1Ø FORY=1TONR
6Ø2Ø :FORX=1TONC
6Ø3Ø ::PRINTPZ$(X,Y);
6Ø4Ø :NEXTX
6Ø5Ø :PRINT"&̲"
6Ø6Ø NEXTY
```

```
6Ø7Ø FORX=1TONC+1:PRINT"&̲";:NEXTX
6Ø8Ø PRINT
6Ø99 RETURN
9ØØØ IFC+1>NCTHEN9Ø99:REM NO WORD
9ØØ5 IFPZ$(C+1,R)="."THEN9Ø99:REM NO ¬
      ¬WORD ACROSS
9Ø1Ø WA=1:REM WORD ACROSS FLAG ON
9Ø2Ø NM=NM+1:REM INCREMENT CURRENT WORD ¬
      ¬NUMBER FOR PUZZLE
9Ø3Ø N(C,R)=NM:REM ASSIGN NUMBER ARRAY
9Ø4Ø W$="":REM INIT WORD
9Ø5Ø Q=C:REM INIT WORD CHARACTER COLUMN
9Ø6Ø IFQ>NCTHENW$(Ø,NM)=W$:GOTO9Ø99
9Ø65 IFPZ$(Q,R)="."THENW$(Ø,NM)=W$:
      ¬GOTO9Ø99:REM WORD FINISHED
9Ø7Ø W$=W$+PZ$(Q,R):REM ADD LETTER TO ¬
      ¬WORD
9Ø8Ø Q=Q+1:REM NEXT LETTER
9Ø9Ø GOTO9Ø6Ø:REM NEXT LETTER
9Ø99 RETURN
91ØØ IFR+1>NRTHEN9199:REM NO WORD DOWN
91Ø5 IFPZ$(C,R+1)="."THEN9199:REM NO ¬
      ¬WORD DOWN
911Ø WD(C)=1:REM WORD DOWN FLAG ON
912Ø IFN(C,R)>ØTHEN915Ø:REM ALREADY HAS ¬
      ¬A NUMBER
913Ø NM=NM+1:REM INCREMENT NUMBER
914Ø N(C,R)=NM:REM ASSIGN NUMBER
915Ø W$="":Q=R:REM INIT WORD AND WORD ¬
      ¬CHARACTER ROW
916Ø IFQ>NRTHENW$(1,NM)=W$:GOTO9199
9165 IFPZ$(C,Q)="."THENW$(1,NM)=W$:
      ¬GOTO9199:REM WORD FINISHED
917Ø W$=W$+PZ$(C,Q):REM ADD LETTER TO ¬
      ¬WORD
918Ø Q=Q+1:REM NEXT LETTER
919Ø GOTO916Ø:REM NEXT LETTER
9199 RETURN
9999 END
1Ø1ØØ IFXX$=""THENXX$="r̲ HIT SPACE TO ¬
      ¬CONTINUE r̂" : REM GET 1 CHARACTER
1Ø12Ø IFXX$<>" "THENPRINTXX$; : REM ¬
      ¬PRINT MESSAGE
```

```
 10130 GETXA$:IFXA$>""THEN10130:REM ¬
       ¬CLEAR BUFFER
 10140 GETXA$:IFXA$=""THEN10140
 10150 XA=VAL(XA$)
 10199 XX$="":RETURN
 10200 IFXP$=""THENXP$="?" : REM SET ¬
       ¬DEFAULT PROMPT - INPUT WITH PROMPT
 10220 GETXA$:IFXA$<>""THEN10220:
       ¬REM CLEAR BUFFER
 10250 XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
       ¬4):REM SET UP FOR PROMPT
 10260 PRINTXQ$;XB$;:REM PRINTS THE ¬
       ¬QUESTION FOLLOWED WITH PROPOSED ¬
       ¬ANSWER
 10270 INPUTXA$
 10280 XA=VAL(XA$)
 10299 XP$="":XB$="":XQ$="":RETURN
READY.
```

Wordsearch—A Hunt for Hidden Words

by Len Lindsay

Here's your chance to be the King of the Puzzle World. As Benevolent Dictator, use this hide-a-word puzzle to challenge friends and students. You're in complete control of the hidden words and can tailor this puzzle to fit like a glove.

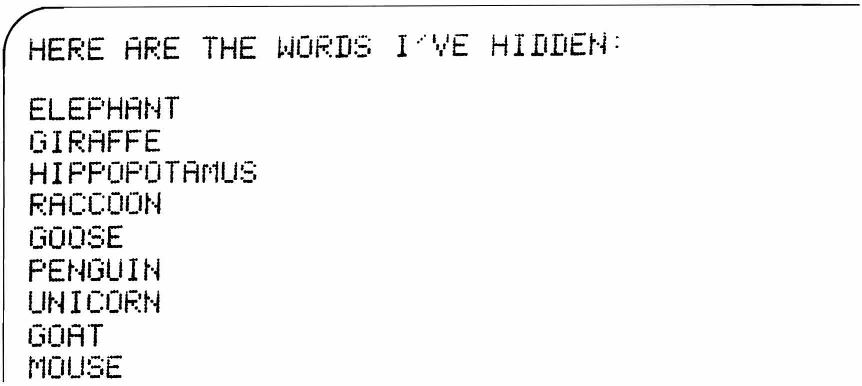
If you have a printer, players can puzzle over a copy. But you don't need more equipment to enjoy this game—just figure it out on the screen.

The basic program creates a puzzle of the words you select, hidden randomly. You have a variety of options as creator. PET will print the puzzle on your screen or printer. The puzzle dimensions are variable, and PET will supply an answer key as well as a list of the words you've hidden. You can choose from a MENU of variations, such as a new puzzle PET creates for you from the same list of words. Your MENU includes:

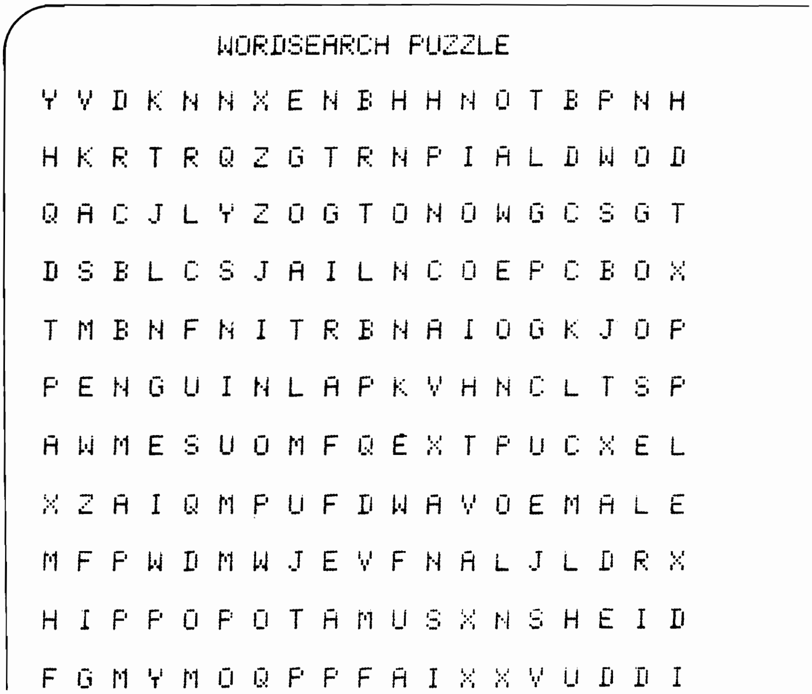
1. Print a list of hidden words to screen or printer.
2. Print the puzzle on the screen or printer.
3. Print an answer key on the screen or printer.
4. Create a new puzzle using the words already supplied.
5. Start a new puzzle with new words.
6. End the program.

Try entering your longest words first. If PET has a problem fitting words into your puzzle, it will let you know. PET hasn't forgotten you and will do its level best to help you create a seeming chaos of letters concealing your hidden words.

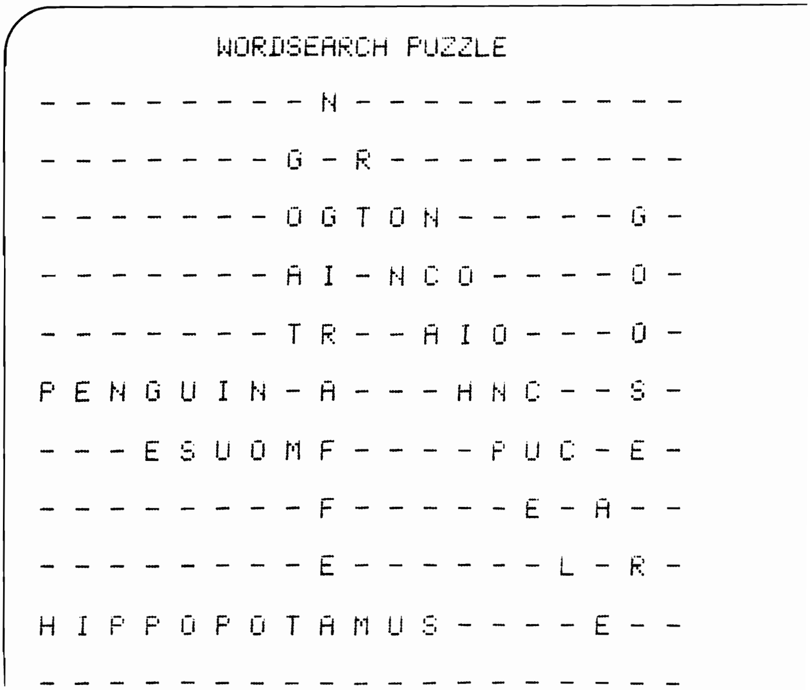
Here's a sample puzzle:



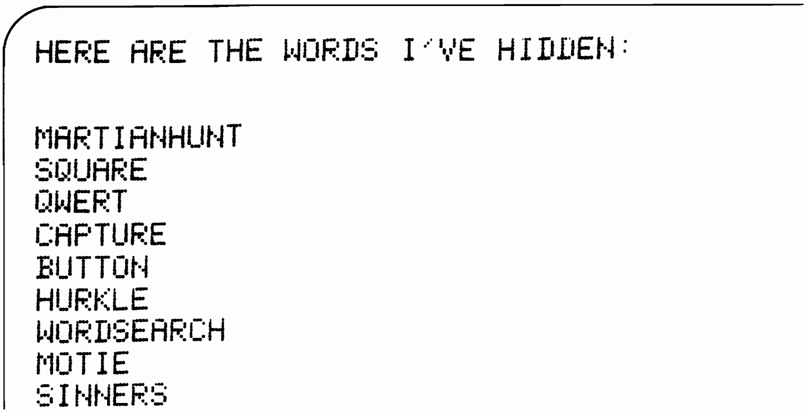
```
HERE ARE THE WORDS I'VE HIDDEN:

ELEPHANT
GIRAFFE
HIPPOPOTAMUS
RACCOON
GOOSE
PENGUIN
UNICORN
GOAT
MOUSE
```



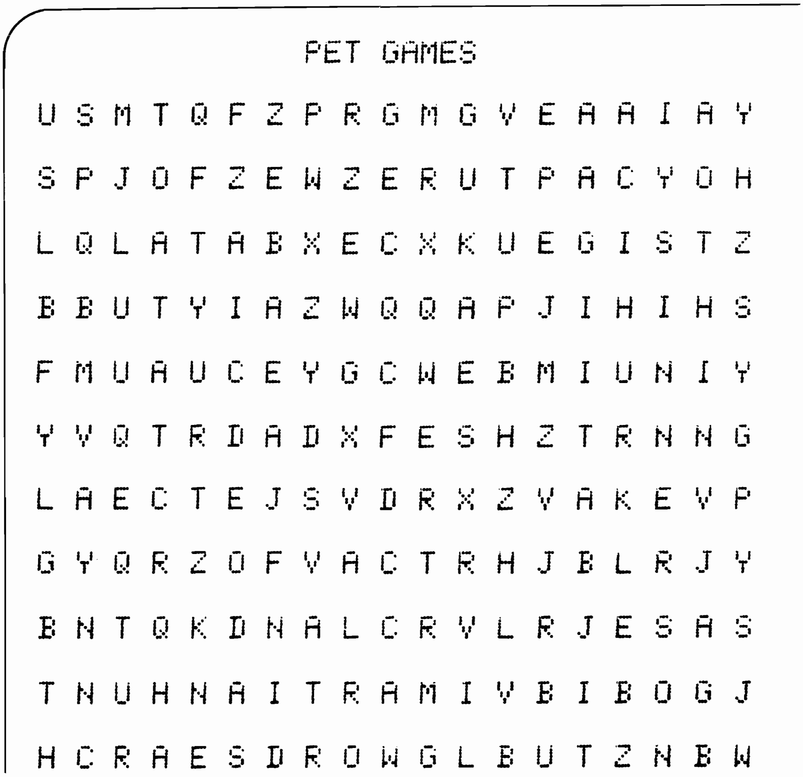
```
            WORDSEARCH PUZZLE

Y V D K N N X E N B H H N O T B P N H

H K R T R Q Z G T R N P I A L D W O D

Q A C J L Y Z O G T O N O W G C S G T

D S B L C S J A I L N C O E P C B O X

T M B N F N I T R B N A I O G K J O P

P E N G U I N L A P K V H N C L T S P

A W M E S U O M F Q E X T P U C X E L

X Z A I Q M P U F D W A V O E M A L E

M F P W D M W J E V F N A L J L D R X

H I P P O P O T A M U S X N S H E I D

F G M Y M O Q P P F A I X X V U D D I
```



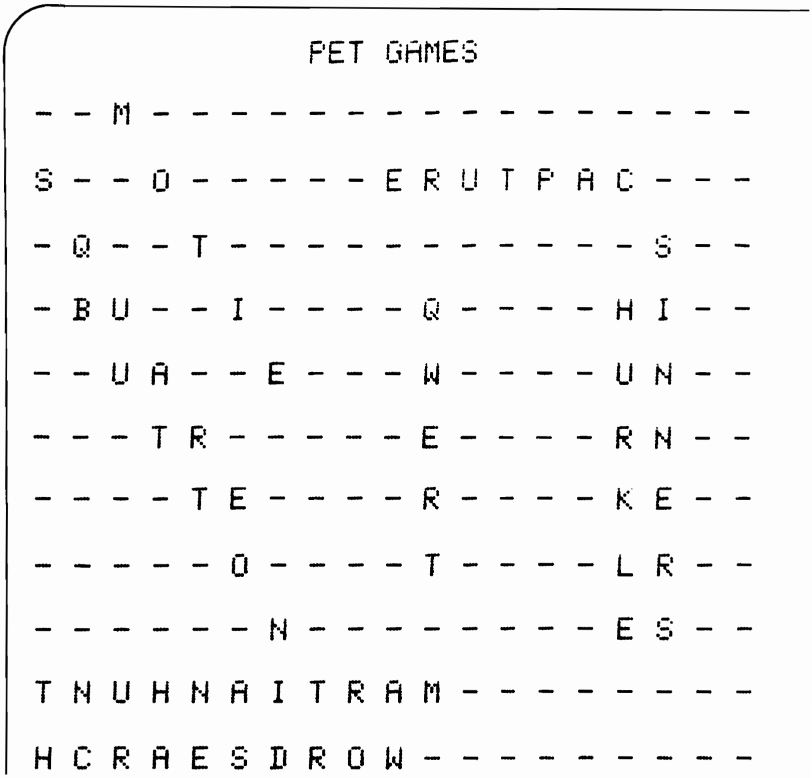
```
            WORDSEARCH PUZZLE

- - - - - - - - N - - - - - - - - - -

- - - - - - - G - R - - - - - - - - -

- - - - - - - O G T O N - - - - - G -

- - - - - - - A I - N C O - - - - O -

- - - - - - - T R - - A I O - - - O -

P E N G U I N - A - - - H N C - - S -

- - - E S U O M F - - - - P U C - E -

- - - - - - - - F - - - - - E - A - -

- - - - - - - - E - - - - - - L - R -

H I P P O P O T A M U S - - - - E - -

- - - - - - - - - - - - - - - - - - -
```



```
HERE ARE THE WORDS I'VE HIDDEN:

MARTIANHUNT
SQUARE
QWERT
CAPTURE
BUTTON
HURKLE
WORDSEARCH
MOTIE
SINNERS
```



```
              PET GAMES

U S M T Q F Z P R G M G V E A A I A Y

S P J O F Z E W Z E R U T P A C Y O H

L Q L A T A B X E C X K U E G I S T Z

B B U T Y I A Z W Q Q A P J I H I H S

F M U A U C E Y G C W E B M I U N I Y

Y V Q T R D A D X F E S H Z T R N N G

L A E C T E J S V D R X Z V A K E V P

G Y Q R Z O F V A C T R H J B L R J Y

B N T Q K D N A L C R V L R J E S A S

T N U H N A I T R A M I V B I B O G J

H C R A E S D R O W G L B U T Z N B W
```



```
                 PET GAMES

- - M - - - - - - - - - - - - - - - -

S - - O - - - - - E R U T P A C - - -

- Q - - T - - - - - - - - - - - S - -

- B U - - I - - - - Q - - - - H I - -

- - U A - - E - - - W - - - - U N - -

- - - T R - - - - - E - - - - R N - -

- - - - T E - - - - R - - - - K E - -

- - - - - O - - - - T - - - - L R - -

- - - - - - N - - - - - - - - E S - -

T N U H N A I T R A M - - - - - - - -

H C R A E S D R O W - - - - - - - - -
```

For more words, consult: Jane Shaw Whitfield. *Webster's New World Crossword Puzzle Dictionary* (New York: Collins, 1975).

Level C: This is a favorite for crossword addicts, and an incredibly versatile tool for personalized entertainment and education.

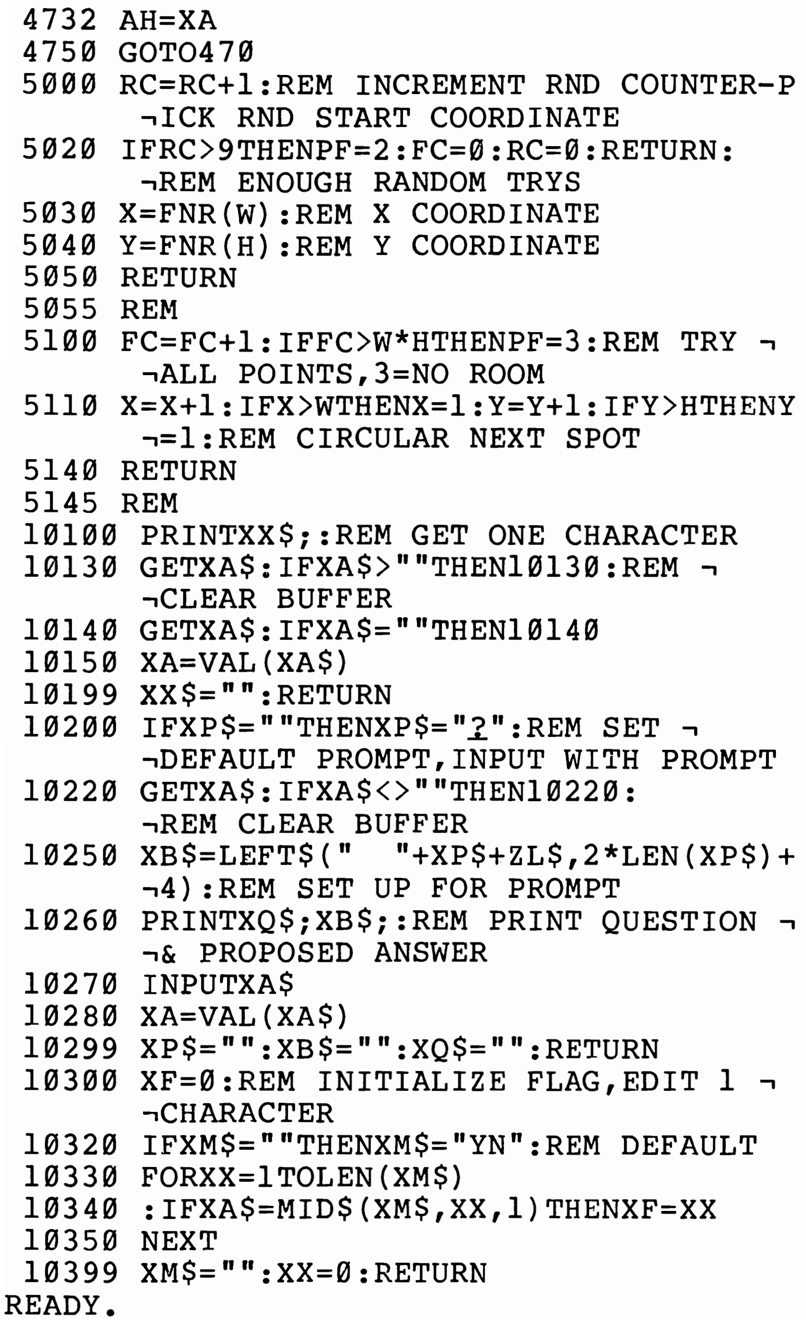
```
Ø REM WORKS ON PET 2ØØ1-8, NEW PET/CBM,
      ¬ BASIC 4.Ø, AND CBM 8Ø32 & 8Ø16
1 REM *** WORDSEARCH
2 REM *** ORIGINAL PROGRAM
3 REM *** (C) 198Ø
4 REM *** LEN LINDSAY
5 REM *** Ø4/18/8Ø
9 REM
1Ø ZP=PEEK(5ØØØ3):IFZP>1THENZP=2:
      ¬IFPEEK(34816)<>32THENZP=3:
      ¬REM SET PET TYPE
11 REM ZP MEANS: Ø=OLD, 1=NEW, 2=BASIC ¬
      ¬4.Ø, 3=8Ø COLUMN WITH BASIC 4.Ø
15 POKE59468,12
2Ø PRINT"ĥ";
3Ø X=RND(-TI):REM SEED RND GENERATOR
4Ø DEFFNR(X)=INT(RND(1)*X+1):REM CHOSE ¬
      ¬RANDOM # FROM 1 TO X
5Ø ZZ$="
      ¬":REM 4Ø DELETES
51 IFZP=3THENZZ$=ZZ$+ZZ$:REM FOR 8Ø ¬
      ¬COLUMN SCREEN
52 ZL$="←←←←←←←←←←":REM 1Ø CURSOR LEFT
54 ZS$="                                    ¬
      ¬           ":REM 4Ø SPACES
96 XX$="ĥr̲WILL YOU BE USING A PRINTER?":
      ¬GOSUB1Ø1ØØ:PRINT:IFXA$<>"Y"THEN99
97 XQ$="PRINTER DEVICE #":XP$="4":
      ¬GOSUB1Ø2ØØ:PD=XA
98 IFPD<3ORPD>15THENPRINTZZ$;:GOTO97
99 IFRPTHENRETURN
1ØØ IFRN>ØTHEN22ØØ:REM RESTART SKIP TO ¬
      ¬MENU
1Ø1 REM
1Ø2 PRINT"ĥWELCOME TO WORD SEARCH"
11Ø PRINT"↓I WILL HIDE WORDS YOU SUPPLY ¬
      ¬INTO A"
12Ø PRINT"↓WORDSEARCH PUZZLE. I CAN ¬
      ¬ALSO GIVE YOU
13Ø PRINT"↓AN ANSWER KEY.↓↓"
145 REM
15Ø AW=19 : REM PUZZLE WIDTH - FOR ¬
      ¬PRINTER MAY GO UP TO   AW=39
```

```
152 AH=11 : REM PUZZLE HEIGTH- FOR ¬
      ¬PRINTER MAY GO UP TO   AH=31
190 DIMW$(AW,AH):REM PUZZLE ARRAY
200 XQ$="HOW MANY WORDS TO HIDE":
      ¬XP$="9":GOSUB10200
210 NW=XA:IFNW>99ORNW<1THENPRINTZZ$;:
      ¬GOTO200
220 DIMS$(NW):REM WORD ARRAY
230 PRINT"ĥWHAT IS THE TITLE OF THIS ¬
      ¬PUZZLE?":GOSUB10200:TP$=XA$
235 REM
400 PRINT"ĥPUZZLE: r̲";TP$:PRINT"↓ENTER ¬
      ¬YOUR WORDS NOW."
404 PRINT"↓ENTER r̲^r̂ TO GO BACK AND ¬
      ¬REDO A WORD.
407 PRINT"↓ENTER r̲\r̂ TO END INPUT OF ¬
      ¬WORDS EARLY.↓"
410 FORZ=1TONW
420 :IFZ<1THENZ=1
422 :PRINT"r̲↓ENTER WORD NUMBER_"+STR$(Z)
      ¬+"_PLEASE":GOSUB10200
425 :IFXA$="\"ANDZ=1THENPRINT"ĥr̲YOU ¬
      ¬DON'T HAVE ANY WORDS YET":GOTO404
430 :IFXA$="^"THENZ=Z-1:PRINT"BACK TO ¬
      ¬REDO "+S$(Z):GOTO420
435 IFLEN(XA$)>AWANDLEN(XA$)>AHTHENPRINT
      ¬"r̲THAT WORD IS TOO LONG":PRINT:
      ¬GOTO422
440 :S$(Z)=XA$
450 :IFXA$="\"THENQ=Z-1:Z=NW:NW=Q
455 :IFXA$="?̲"THENPRINTZZ$;:GOSUB10200:
      ¬GOTO430
460 NEXTZ
470 PRINT"ĥTHANK YOU - PLEASE WAIT ¬
      ¬WHILE I THINK"
475 REM
500 D=FNR(3):GOSUB3310:REM INIT ¬
      ¬DIRECTION & PUZZLE ARRAY
1000 FORCW=1TONW:REM PUT WORDS IN ARRAY
1005 :PRINTCW;"OF";NW;"-";
1010 :CW$=S$(CW):REM CURRENT WORD
1020 :CL=LEN(CW$):REM CURRENT WORD ¬
      ¬LENGTH
```

```
1Ø3Ø :DF=Ø:REM DIRECTION FLAG
1Ø4Ø :DF=DF+1:REM INCREMENT DIRECTION ¬
      ¬FLAG COUNTER
1Ø5Ø :IFDF>3THENPRINT"ĥ";CW$;"_WON'T ¬
      ¬FIT":PRINT"TRY r̲Dr̂":GOTO222Ø
1Ø6Ø :D=D+1:IFD>3THEND=1:REM CIRCULAR ¬
      ¬DIRECTION CHANGE
1Ø7Ø :DX=Ø:W=AW:IFD<3THENW=W-CL:DX=1:
      ¬IFW<ØTHEN1Ø4Ø:REM MOVE>>
1Ø8Ø :DY=Ø:H=AH:IFD>1THENH=H-CL:DY=1:
      ¬IFH<ØTHEN1Ø4Ø:REM MOVEVV
1Ø9Ø :PF=1:REM POINT FLAG 1=RANDOM,
      ¬2=ALL,3=DONE
1999 :REM PICK START COORDINATE
2ØØØ :ONPFGOSUB5ØØØ,51ØØ:IFPF>2THEN1Ø4Ø:
      ¬REM TRY NEXT DIRECTION
2Ø1Ø :REM TEST
2Ø15 :TX=X:TY=Y:TF=Ø
2Ø2Ø :FORT=1TOCL
2Ø25 ::IFTY>AHORTX>AWTHENTF=1:T=CL:
      ¬GOTO2Ø5Ø:REM WORD PAST BORDER
2Ø3Ø ::IFW$(TX,TY)<>"-"THENTF=1:T=CL:
      ¬REM SPOT IS OCCUPIED
2Ø4Ø ::TX=TX+DX:TY=TY+DY:REM UPDATE ¬
      ¬COORDINATE TO NEXT POINT IN WORD
2Ø5Ø :NEXTT:PRINT"*";
2Ø6Ø :IFTFTHENTF=Ø:GOTO2ØØØ:REM NO FIT
2Ø7Ø :REM ADD WORD
2Ø8Ø :B=FNR(2)-1:REM Ø=WORD AS IS  ¬
      ¬1=WORD BACKWARDS
2Ø9Ø :FORT=1+((CL-1)*B)TO1+((CL-1)*(1-B)
      ¬)STEP1-(2*B)
21ØØ ::W$(X,Y)=MID$(CW$,T,1)
211Ø ::X=X+DX:Y=Y+DY
212Ø :NEXTT
213Ø :PRINT:PRINT"r̲";CW$;"r̂";"_IS ADDED"
215Ø NEXTCW
2155 REM
22ØØ RN=1:PRINT"ĥr̲OPTION MENU"
222Ø PRINT"↓r̲Wr̂ORD LIST"
223Ø PRINT"↓r̲Pr̂UZZLE"
224Ø PRINT"↓r̲Ar̂NSWER KEY"
2241 PRINT"↓(HIT r̲SPACEr̂ TO CONTINUE ¬
      ¬AFTER THE ABOVE)"
```

```
2242 PRINT"↓↓  OR"
2243 PRINT"↓ṟDr̂IFFERENT PUZZLE-SAME ¬
      ¬WORDS"
2244 PRINT"↓ṟNr̂EW WORDS & PUZZLE"
2245 PRINT"↓ṟEr̂ND"
225Ø XX$="↓ṟYOUR CHOICE?":GOSUB1Ø1ØØ:
      ¬PRINT
2255 XM$="WPADNE":GOSUB1Ø3ØØ:CH=XF:
      ¬REM EDIT
226Ø ONCHGOSUB227Ø,227Ø,227Ø,47ØØ,37ØØ,
      ¬29ØØ
2265 GOTO22ØØ
2267 REM
227Ø DV=3:IFPDTHENXX$="ĥPRINT TO ¬
      ¬ṟSr̂CREEN OR ṟPr̂RINTER":GOSUB1Ø1ØØ:
      ¬PRINT
228Ø IFPD>ØANDXA$="P"THENDV=PD
231Ø PRINT"ĥ";
232Ø OPEN1,DV
2325 IFDV>3THEN PRINT"PRINTING TO YOUR ¬
      ¬PRINTER"
233Ø ONCHGOSUB45ØØ,3ØØØ,4ØØØ:CLOSE1
2335 IFDV=3THENGOSUB1Ø13Ø:REM FREEZE ¬
      ¬TILL KEY HIT
234Ø GOTO22ØØ
2345 REM
29ØØ PRINT"ĥTHAT WAS FUN - TRY IT AGAIN ¬
      ¬LATER.":END
29Ø5 REM
3ØØØ PRINT#1,LEFT$(ZS$,(2*AW-LEN(TP$))/2
      ¬)+TP$:REM TITLE-PRINT PUZZLE
3Ø2Ø PRINT#1:REM BLANK
3Ø3Ø FORY=1TOAH
3Ø4Ø :FORX=1TOAW
3Ø5Ø ::IFW$(X,Y)="-"THENPRINT#1,
      ¬CHR$(64+FNR(26));:GOTO3Ø7Ø:
      ¬REM RANDOM
3Ø6Ø ::PRINT#1,W$(X,Y);:REM CORRECT ¬
      ¬LETTER
3Ø7Ø ::PRINT#1,"_";:REM SPACE AFTER ¬
      ¬LETTER
3Ø8Ø :NEXTX
3Ø9Ø :PRINT#1:REM CARRIAGE RETURN
31ØØ :PRINT#1:REM BLANK
```

```
3110 NEXTY
3130 RETURN
3135 REM
3310 FORY=1TOAH
3320 :FORX=1TOAW
3330 ::W$(X,Y)="-"
3340 :NEXTX
3350 NEXTY:RETURN
3355 REM
3645 REM
3700 RUN
3705 REM
4000 PRINT#1,LEFT$(ZS$,(2*AW-LEN(TP$))/2
      ¬)+TP$:REM TITLE-ANSWER KEY
4020 PRINT#1:REM BLANK
4030 FORY=1TOAH
4040 :FORX=1TOAW
4050 ::PRINT#1,W$(X,Y);:REM PRINT LETTER
4060 ::PRINT#1,"_";:REM SPACE AFTER ¬
      ¬LETTER
4070 :NEXTX
4080 :PRINT#1:REM CARRIAGE RETURN
4090 :PRINT#1:REM BLANK
4100 NEXTY
4120 RETURN
4125 REM
4500 PRINT#1,"HERE ARE THE WORDS I'VE ¬
      ¬HIDDEN:"
4520 FORZ=1TONW
4530 :PRINT#1,S$(Z):REM PRINT WORD
4540 NEXTZ
4560 RETURN
4565 REM
4700 XX$="ĥSAME SIZE?":GOSUB10100:
      ¬IFXA$="Y"THEN470
4710 IFXA$<>"N"THEN4700
4720 XQ$="ĥHOW WIDE (10-19)":GOSUB10200:
      ¬IFXA<10ORXA>39THEN4720:REM ¬
      ¬LINE150SETMA
4722 AW=XA
4730 XQ$="ĥ↓HOW HIGH (10-11)":GOSUB10200
      ¬:IFXA<10ORXA>31THEN4730:REMLINE152
      ¬SETMAX
```



```
 4732 AH=XA
 475Ø GOTO47Ø
 5ØØØ RC=RC+1:REM INCREMENT RND COUNTER-P
       ¬ICK RND START COORDINATE
 5Ø2Ø IFRC>9THENPF=2:FC=Ø:RC=Ø:RETURN:
       ¬REM ENOUGH RANDOM TRYS
 5Ø3Ø X=FNR(W):REM X COORDINATE
 5Ø4Ø Y=FNR(H):REM Y COORDINATE
 5Ø5Ø RETURN
 5Ø55 REM
 51ØØ FC=FC+1:IFFC>W*HTHENPF=3:REM TRY ¬
       ¬ALL POINTS,3=NO ROOM
 511Ø X=X+1:IFX>WTHENX=1:Y=Y+1:IFY>HTHENY
       ¬=1:REM CIRCULAR NEXT SPOT
 514Ø RETURN
 5145 REM
 1Ø1ØØ PRINTXX$;:REM GET ONE CHARACTER
 1Ø13Ø GETXA$:IFXA$>""THEN1Ø13Ø:REM ¬
       ¬CLEAR BUFFER
 1Ø14Ø GETXA$:IFXA$=""THEN1Ø14Ø
 1Ø15Ø XA=VAL(XA$)
 1Ø199 XX$="":RETURN
 1Ø2ØØ IFXP$=""THENXP$="?":REM SET ¬
       ¬DEFAULT PROMPT,INPUT WITH PROMPT
 1Ø22Ø GETXA$:IFXA$<>""THEN1Ø22Ø:
       ¬REM CLEAR BUFFER
 1Ø25Ø XB$=LEFT$("  "+XP$+ZL$,2*LEN(XP$)+
       ¬4):REM SET UP FOR PROMPT
 1Ø26Ø PRINTXQ$;XB$;:REM PRINT QUESTION ¬
       ¬& PROPOSED ANSWER
 1Ø27Ø INPUTXA$
 1Ø28Ø XA=VAL(XA$)
 1Ø299 XP$="":XB$="":XQ$="":RETURN
 1Ø3ØØ XF=Ø:REM INITIALIZE FLAG,EDIT 1 ¬
       ¬CHARACTER
 1Ø32Ø IFXM$=""THENXM$="YN":REM DEFAULT
 1Ø33Ø FORXX=1TOLEN(XM$)
 1Ø34Ø :IFXA$=MID$(XM$,XX,1)THENXF=XX
 1Ø35Ø NEXT
 1Ø399 XM$="":XX=Ø:RETURN
READY.
```

Chapter 6

Recreations

Bouncing Ball Track Ways

by Len Lindsay

Crisscross your screen with a trail made by your clever PET Computer!

```
10 REM***BOUNCING BALL TRACK WAYS***
20 PRINT"ĥ"; : REM CLEAR SCREEN
30 CL$="W̲" : REM CLEAR PREVIOUS BALL
32 R$="Q̲<" : REM MOVE BALL RIGHT
34 L$="<<Q̲<" : REM MOVE BALL LEFT
36 U$="↑<Q̲<" : REM MOVE BALL UP
38 D$="↓<Q̲<" : REM MOVE BALL DOWN
40 RD$="↓Q̲<" : REM MOVE BALL RIGHT DOWN
42 LD$="↓<<Q̲<" : REM MOVE BALL LEFT DOWN
44 RU$="↑Q̲<" : REM MOVE BALL RIGHT UP
46 LU$="↑<<Q̲<" : REM MOVE BALL LEFT UP
100 MB$=D$ : NB=24 : GOSUB 1000
110 MB$=R$ : NB=24 : GOSUB 1000
120 MB$=LU$: NB=24 : GOSUB 1000
130 MB$=R$ : NB=24 : GOSUB 1000
140 MB$=LD$: NB=24 : GOSUB 1000
150 MB$=U$ : NB=24 : GOSUB 1000
160 F=1-F
170 CL$=" " : IF F THEN CL$="W̲"
180 GOTO100
```

```
 999 END : REM SUBROUTINE FOLLOWS
 1ØØØ FOR X=1 TO NB : REM NUMBER OF ¬
       ¬BALLS TO PRINT
 1Ø1Ø :PRINT CL$; : REM CLEAR PRESENT ¬
       ¬BALL
 1Ø2Ø :PRINT MB$; : REM MOVE BALL
 1Ø3Ø NEXT X : REM DO NEXT BALL
 1Ø4Ø RETURN : REM GO BACK FOR NEXT TRACK
READY.
```

Hypername
Nameblinker
Namerunner

by Len Lindsay

See what PET can do with your name (or anyone else's, for that matter). Just type the lucky person's name into the program and watch PET go. All three listings are a variation on the theme of "what's in a name." In this case, it's how many things you can make a name do on your screen.

```
 Ø REM *** HYPER NAME   ***
 1 REM (C) LEN LINDSAY 198Ø
 9 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓" :
       ¬ REM 24 DOWN
 1Ø INPUT"ĥWHAT IS YOUR NAME";N$
 9Ø R=INT(RND(Ø)*25)+1
 1ØØ PRINT"ĥ";
 11Ø GOSUB 5ØØ : REM PAUSE
 12Ø IF R>1THEN PRINT LEFT$(ZD$,R-1);
 13Ø PRINT N$;
 14Ø GOSUB 5ØØ : REM PAUSE
 16Ø GOTO9Ø
 5ØØ D=1Ø : REM DELAY FACTOR - THE ¬
       ¬SMALLER THE NUMBER, THE SHORTER ¬
       ¬THE DELAY
 51Ø FOR Z=1 TO D : NEXT Z
 52Ø RETURN
READY.
```

```
 Ø REM *** NAME BLINKER ***
 1 REM (C) LEN LINDSAY 198Ø
 9 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓" :
       ¬ REM 24 DOWN
 1Ø INPUT"ĥWHAT IS YOUR NAME";N$
 2Ø INPUT"ĥ↓↓WHAT ROW SHOULD I BLINK ¬
       ¬YOUR NAME";R$
 3Ø R=VAL(R$)
 4Ø IFR<1 OR R>25 THEN 2Ø
 1ØØ PRINT"ĥ";
 11Ø GOSUB 5ØØ : REM PAUSE
 12Ø IF R>1THEN PRINT LEFT$(ZD$,R-1);
 125 PRINT"r̲"; : REM REVERSE ON
 13Ø PRINT N$;
 14Ø GOSUB 5ØØ : REM PAUSE
 15Ø GOTO1ØØ
 5ØØ D=1ØØ : REM DELAY FACTOR - THE ¬
       ¬SMALLER THE NUMBER, THE SHORTER ¬
       ¬THE DELAY
 51Ø FOR Z=1 TO D : NEXT Z
 52Ø RETURN
READY.
```

```
 Ø REM *** NAME RUNNER  ***
 1 REM (C) LEN LINDSAY 198Ø
 9 ZD$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓" :
       ¬ REM 24 DOWN
 1Ø INPUT"ĥWHAT IS YOUR NAME";N$
 9Ø FOR R =1 TO 25
 1ØØ PRINT"ĥ";
 11Ø GOSUB 5ØØ : REM PAUSE
 12Ø IF R>1THEN PRINT LEFT$(ZD$,R-1);
 13Ø PRINT N$;
 14Ø GOSUB 5ØØ : REM PAUSE
 15Ø NEXT R
 16Ø GOTO9Ø
 5ØØ D=1Ø : REM DELAY FACTOR - THE ¬
       ¬SMALLER THE NUMBER, THE SHORTER ¬
       ¬THE DELAY
 51Ø FOR Z=1 TO D : NEXT Z
 52Ø RETURN
READY.
```

Happy Birthday

by Len Lindsay

This little listing greets important people on their big day. It won't take you much ingenuity to make the computer say "Happy Birthday" to whomever you want to felicitate.

```
 Ø REM ***HAPPY BIRTHDAY***
 1 REM (C) 198Ø LEN LINDSAY
 1Ø PRINT"ĥ"; : REM CLEAR SCREEN
 1ØØ GOSUB 2Ø3ØØ : REM DRAW BORDER
 11Ø PRINT"h̲↓↓↓↓↓↓" : REM SET UP FOR ¬
       ¬MESSAGES
 12Ø M$="HAPPY" : GOSUB1ØØØ
 14Ø M$="BIRTHDAY" : GOSUB 1ØØØ
 16Ø M$="MOTHER" : GOSUB 1ØØØ
 2ØØ GOTO2ØØ : REM HOLD THE ACTION
 999 END
 1ØØØ PRINT TAB(2Ø-LEN(M$)/2);M$ :
       ¬ REM CENTER WORD
 1Ø99 RETURN
 2Ø3ØØ IF LEN(XX$)<>1 THEN XX$="&̲" :
       ¬ REM DEFAULT BORDER CHARACTER - ¬
       ¬BORDER
 2Ø312 XW=4Ø : XH=24 : REM DIMENSIONS
 2Ø32Ø PRINT"h̲"; :REM CURSOR TO TOP
 2Ø33Ø FORXA=1TOXW
 2Ø335 :PRINTXX$; : REM TOP LINE
 2Ø34Ø NEXTXA
 2Ø345 FORXA=1TOXH-1
 2Ø35Ø :PRINT"←↓";XX$; : REM RIGHT SIDE
 2Ø355 NEXTXA
 2Ø36Ø PRINT"h̲→";:REM PUTS CURSOR ONE ¬
       ¬SPOT RIGHT OF STARTING CORNER
 2Ø365 FORXA=1TOXH-1
 2Ø37Ø :PRINT"←↓";XX$; : REM LEFT SIDE
 2Ø375 NEXTXA
 2Ø38Ø FORXA=1TOXW-1
 2Ø385 :PRINTXX$; : REM BOTTOM LINE
 2Ø39Ø NEXTXA
 2Ø395 PRINT"h̲";:REM HOME CURSOR
 2Ø399 RETURN
READY.
```

Starfill

by Len Lindsay

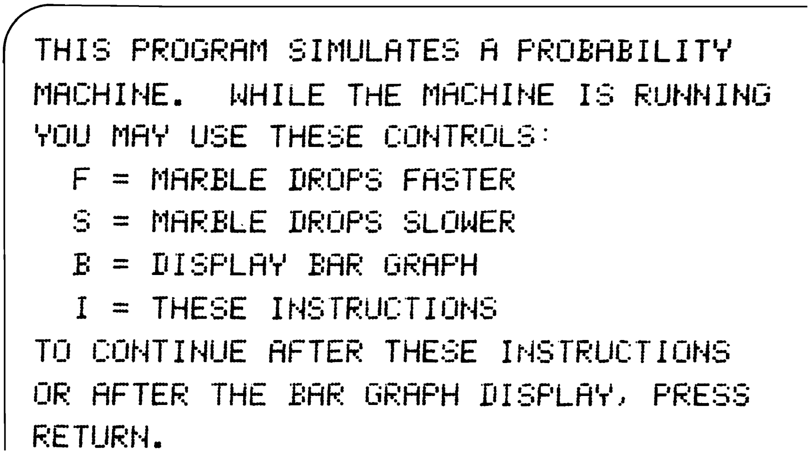
Fill your screen with stars and watch them twinkle in the night. Starlight, starbright, I wish the wish I wish tonight . . . .

```
 Ø REM ***   STAR FILL  ***
 1 REM (C) 198Ø LEN LINDSAY
 1Ø PRINT"ĥ"; : REM CLEAR SCREEN
 1ØØ A=INT(RND(1)*1ØØØ)+1 : REM RANDOM ¬
       ¬SPOT
 11Ø POKE 32768+A,ASC("*") : REM STAR ¬
       ¬ADDER
 12Ø GET A$ : IF A$="" THEN 1ØØ :
       ¬ REM NO KEY HIT
 13Ø GET A$ : IF A$="" THEN 13Ø :
       ¬ REM WAIT TILL KEY HIT AGAIN
 14Ø GOTO 1ØØ
READY.
```

```
 Ø REM ***STARFILL/ERASE***
 1 REM (C) 198Ø LEN LINDSAY
 1Ø PRINT"ĥ"; : REM CLEAR SCREEN
 1ØØ A=INT(RND(1)*1ØØØ)+1 : REM RANDOM ¬
       ¬SPOT
 11Ø POKE 32768+A,ASC("*") : REM STAR ¬
       ¬ADDER
 115 POKE 32768+1ØØØ-A,ASC(" ") :
       ¬ REM STAR ERASER
 12Ø GET A$ : IF A$="" THEN 1ØØ :
       ¬ REM NO KEY HIT
 13Ø GET A$ : IF A$="" THEN 13Ø :
       ¬ REM WAIT TILL KEY HIT AGAIN
 14Ø GOTO 1ØØ
READY.
```

Marblestat

by Mac Oglesby



```
THIS PROGRAM SIMULATES A PROBABILITY
MACHINE.  WHILE THE MACHINE IS RUNNING
YOU MAY USE THESE CONTROLS:
  F = MARBLE DROPS FASTER
  S = MARBLE DROPS SLOWER
  B = DISPLAY BAR GRAPH
  I = THESE INSTRUCTIONS
TO CONTINUE AFTER THESE INSTRUCTIONS
OR AFTER THE BAR GRAPH DISPLAY, PRESS
RETURN.
```

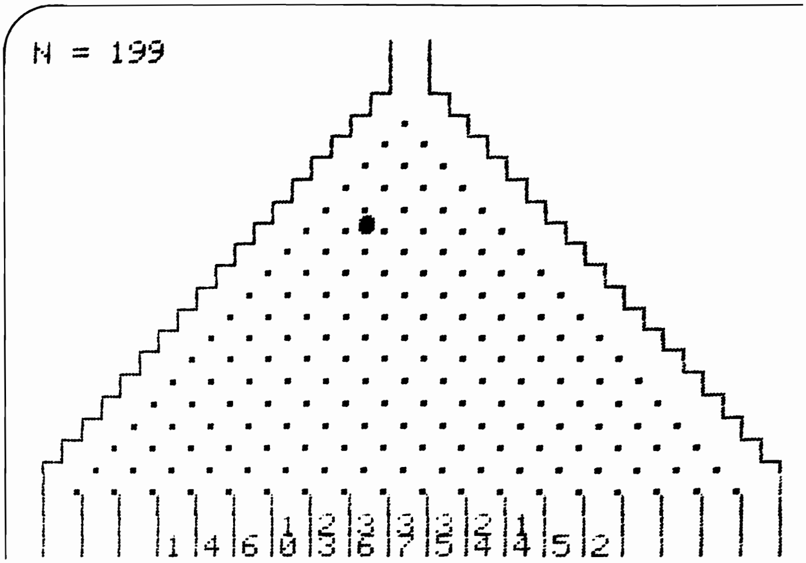
Welcome to the probability machine! Research math and science laboratories (not to mention science museums) frequently have one of these creatures. Mac enables you to have one of your own, at home on your PET computer. Toss a marble into this simple machine. What's the probability that it will fall to the left or to the right? If you toss in a whole bunch, one after another, what's the probability that an equal number of marbles will land in each bin?

The marble hits the peg and goes either to the left or right compartment.

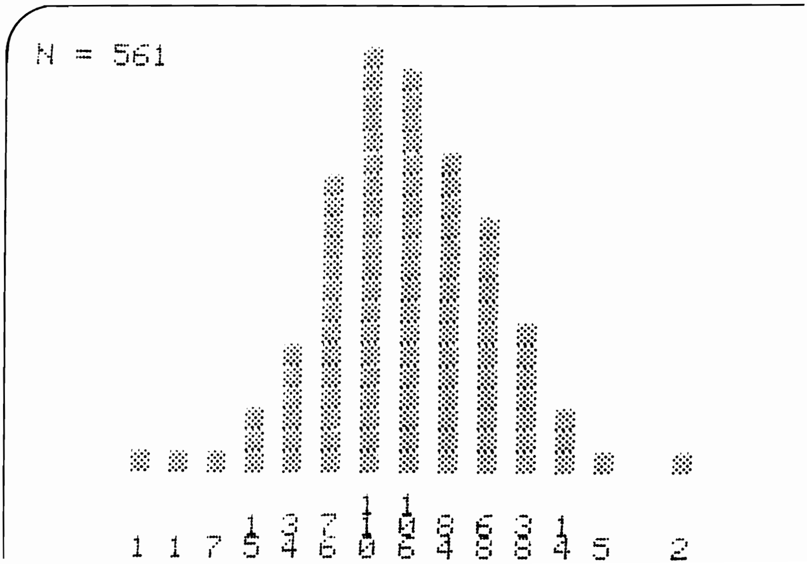
On a slightly more complicated machine, divided into four collecting bins, learned degree-holders after prolonged scientific marble-tossing have determined that the probabilities for each bin are:

1/8 3/8 3/8 1/8

Mac's *Marblestat* lets you select the size of your probability machine—from *two to nineteen* bins! Simply type in the number you want when PET asks you to, and press RETURN. The marbles start falling.

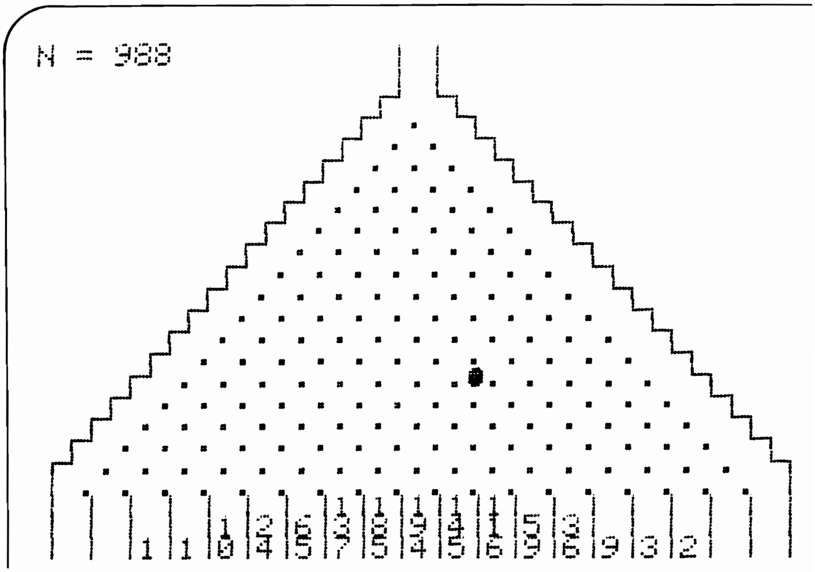


Now, press the B key. PET will show you a bar graph of the current distribution of marbles in compartments. Here's an example:



Press RETURN, and the marbles continue to fall to their chosen destination. If you go for nineteen compartments and leave PET on all night, some compartment will eventually collect 999 marbles. Then the machine stops and displays the final bar graph for you.

You can never lose your marbles with this program!



```
100 REM  NAME:  MARBLESTAT
110 REM  (C)  MAC OGLESBY     7/22/78
120 REM
130 REM THIS SIMULATION OF A PROBABIL-
140 REM ITY MACHINE IS COPYRIGHT 1978
150 REM BY MAC OGLESBY.  PERMISSION IS
160 REM GRANTED FOR USE, BUT NOT FOR
170 REM SALE.
180 REM
190 REM
1000 REM *** INITIALIZATION
1010 DIM T(19)
1100 Z9=40: REM SET INITIAL SPEED
1110 D$="↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓"
1120 R$="→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→
      ¬→→→→→→→"
1150 GOSUB 3000
1200 PRINT "ĥ";
1210 PRINT "BEFORE THE MACHINE STARTS ¬
      ¬YOU MUST"
1220 PRINT
1230 PRINT "DECIDE HOW MANY BOTTOM ¬
      ¬COMPARTMENTS"
1235 PRINT
1240 PRINT "THERE WILL BE.  PLEASE TYPE ¬
      ¬ANY"
1245 PRINT
1250 PRINT "WHOLE NUMBER FROM 2 TO 19";
1260 INPUT BN
1270 IF BN<>INT(BN) THEN 1245
1280 IF (19-BN)*(BN-2)<0 THEN 1245
1800 GOSUB 8000
2000 REM *** DROP A MARBLE
2010 N=N+1
2020 PRINT "hN =";N
2100 PRINT "h";LEFT$(R$,19);"Q";
2110 T=10
2130 FOR J=1 TO 21-BN
2140 : GOSUB 5000
2200 : PRINT "← ↓←Q";
2210 NEXT J
2300 R1=1
2310 FOR J=1 TO BN-1
```

```
2320 : IF RND(1)<.5 THEN R1=-R1
2330 : GOSUB 5000
2340 : PRINT "← ←↓";
2350 : IF R1<0 THEN PRINT "←←";
2360 : PRINT "→Q̲";
2365 : T=T+R1/2
2370 NEXT J
2380 GOSUB 5000
2390 PRINT "← "
2400 T=INT(T): T(T)=T(T)+1
2410 IF T(T)=999 THEN GOSUB 6000: END
2500 GET Z$: IF Z$="" THEN GOSUB 9000:
      ¬ GOTO 2000
2510 IF Z$="F" THEN Z9=Z9*.8: GOSUB 9000
2520 IF Z$="S" THEN Z9=Z9*1.25: GOSUB ¬
      ¬9000
2530 IF Z$="I" THEN GOSUB 3000: GOSUB ¬
      ¬8000
2540 IF Z$="B" THEN GOSUB 6000: GOSUB ¬
      ¬8000
2550 GOTO 2000
3000 REM *** INSTRUCTIONS
3100 PRINT "ĥ";
3110 PRINT "          M A R B L E S T A ¬
      ¬T"
3120 PRINT:PRINT:PRINT
3130 PRINT "THIS PROGRAM SIMULATES A ¬
      ¬PROBABILITY"
3135 PRINT
3140 PRINT "MACHINE.  WHILE THE MACHINE ¬
      ¬IS RUNNING"
3145 PRINT
3150 PRINT "YOU MAY USE THESE CONTROLS:"
3160 PRINT
3170 PRINT "  F = MARBLE DROPS FASTER"
3180 PRINT
3190 PRINT "  S = MARBLE DROPS SLOWER"
3200 PRINT
3210 PRINT "  B = DISPLAY BAR GRAPH"
3220 PRINT
3230 PRINT "  I = THESE INSTRUCTIONS"
3240 PRINT
```

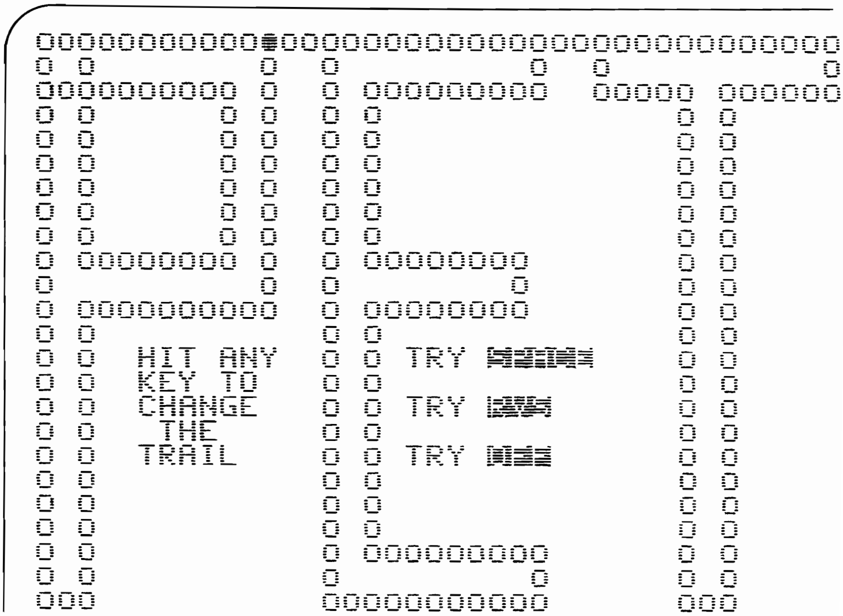
```
3250 PRINT "TO CONTINUE AFTER THESE ¬
      ¬INSTRUCTIONS"
3255 PRINT
326Ø PRINT "OR AFTER THE BAR GRAPH ¬
      ¬DISPLAY, PRESS"
327Ø PRINT
328Ø PRINT "RETURN."
35ØØ GET Z$: IF Z$="" THEN 35ØØ
351Ø IF ASC(Z$)=13 THEN RETURN
352Ø GOTO 35ØØ
5ØØØ REM *** DELAY
51ØØ FOR J1=1 TO Z9: NEXT J1
52ØØ RETURN
6ØØØ REM *** BAR GRAPH
61ØØ PRINT "ĥ";
619Ø B1=Ø
62ØØ FOR J=1 TO 19
621Ø : IF T(J)>B1 THEN B1=T(J)
622Ø NEXT J
623Ø B1=2Ø/B1: IF B1>1 THEN B1=1
624Ø FOR J=1 TO 19
625Ø : IF T(J)=Ø THEN 63ØØ
6255 : PRINT "h̲";D$;LEFT$(R$,2*J-1);
6257 : IF BN/2=INT(BN/2) THEN PRINT "  ";
626Ø : FOR K=1 TO INT(T(J)*B1+.5)
627Ø : : PRINT "&̲↑<";
628Ø : NEXT K
63ØØ NEXT J
64ØØ FOR T=1 TO 19
641Ø : GOSUB 9ØØØ
642Ø NEXT T
65ØØ PRINT "h̲N =";N
69ØØ GET Z$: IF Z$="" THEN 69ØØ
691Ø IF ASC(Z$)=13 THEN RETURN
692Ø GOTO 69ØØ
8ØØØ REM *** PRINT STAT DEVICE
81ØØ PRINT "ĥ";
823Ø D1$="                  "
824Ø D2$="1̲ 1̲"
825Ø H1$=". "
826Ø FOR J=1 TO 21-BN
827Ø : PRINT D1$;D2$
8275 NEXT J
```

```
 8280 PRINT D1$;"←Ø= -."
 8290 IF BN=2 THEN 8382
 8300 FOR J=1 TO BN-2
 8310 : IF J=17 THEN 8360
 8320 : PRINT LEFT$(D1$,17-J);
 8360 : PRINT "Ø= "+H1$+"-."
 8370 : H1$=". "+H1$
 8380 NEXT J
 8382 IF BN=19 THEN 8390
 8385 PRINT LEFT$(D1$,19-BN);
 8390 PRINT "⊥ "+H1$+"⊥"
 8500 FOR J=1 TO 3
 8505 : IF BN=19 THEN 8520
 8510 : PRINT LEFT$(D1$,19-BN);
 8520 : FOR K=1 TO BN
 8530 : : PRINT "⊥ ";
 8540 : NEXT K
 8600 : PRINT "⊥"
 8620 NEXT J
 8700 FOR T=1 TO 19
 8710 : GOSUB 9000
 8720 NEXT T
 8800 RETURN
 9000 REM *** PRINT FREQUENCIES
 9100 X=T(T): IF X=0 THEN RETURN
 9110 N1=INT(X/100): X=X-100*N1
 9120 N2=INT(X/10): X=X-10*N2
 9200 PRINT "h";D$;"↓↓";
 9205 IF BN/2=INT(BN/2) THEN PRINT " ";
 9210 PRINT LEFT$(R$,2*T-1);
 9220 IF N1=0 THEN PRINT " ";: GOTO 9300
 9230 PRINT RIGHT$(STR$(N1),1);
 9300 PRINT "←↓";
 9310 IF N1=0 AND N2=0 THEN PRINT " ";:
        ¬ GOTO 9350
 9320 PRINT RIGHT$(STR$(N2),1);
 9350 PRINT "←↓";
 9400 PRINT RIGHT$(STR$(X),1)
 9500 RETURN
READY.
```

Petsketch

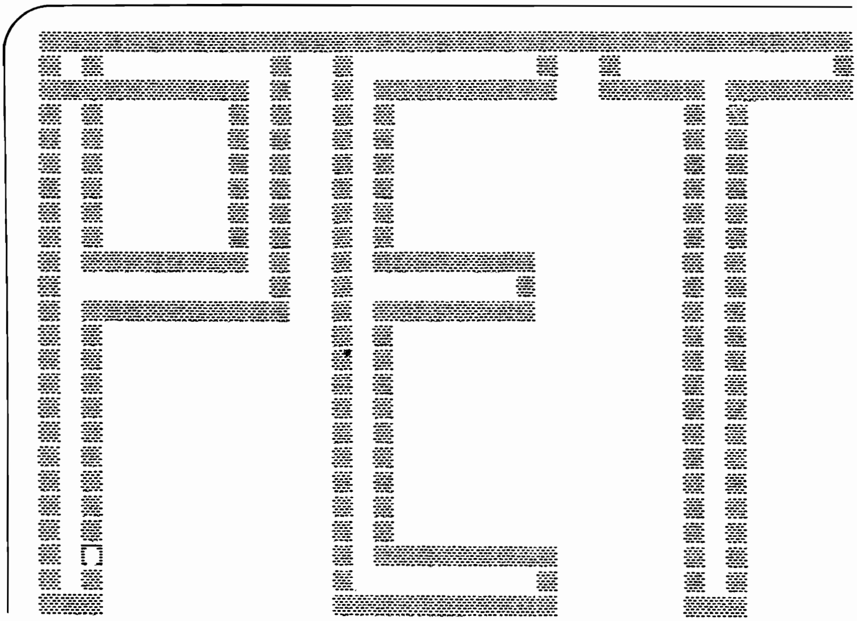
by Len Lindsay

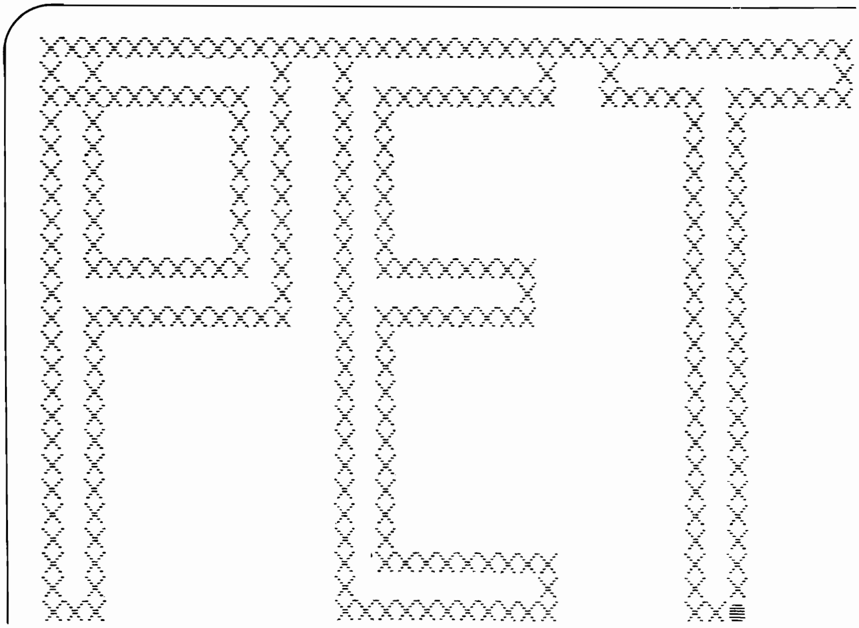
This program emblazons "PET" in big, bold psychedelic letters on your computer screen. Hit any key to change the trail. Be adventuresome and press:

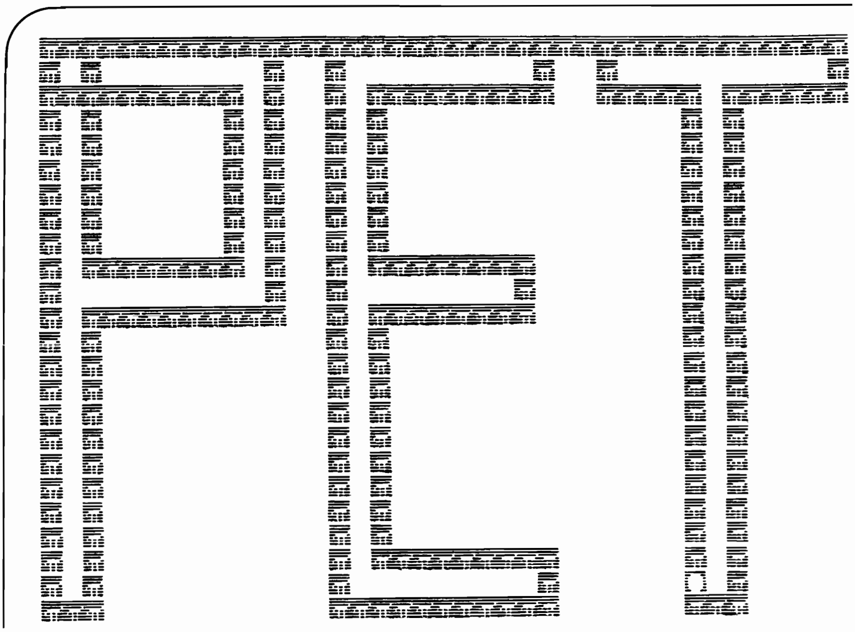


```
OOOOOOOOOOO▓OOOOOOOOOOOOOOOOOOOOOOOOOOOO
O O        O  O         O   O          O
OOOOOOOOOO O  O OOOOOOOOO   OOOOO OOOOOO
O O      O O  O O               O O
O O      O O  O O               O O
O O      O O  O O               O O
O O      O O  O O               O O
O O      O O  O O               O O
O O      O O  O O               O O
O OOOOOOOO O  O OOOOOOOO        O O
O          O  O        O        O O
O OOOOOOOOOO  O OOOOOOOO        O O
O O           O O               O O
O O  HIT ANY  O O TRY ▒▒▒▒▒     O O
O O  KEY TO   O O               O O
O O  CHANGE   O O TRY ▒▒▒       O O
O O   THE     O O               O O
O O  TRAIL    O O TRY ▒▒▒       O O
O O           O O               O O
O O           O O               O O
O O           O O               O O
O O           O OOOOOOOOO       O O
O O           O         O       O O
OOO           OOOOOOOOOOO       OOO
```

Keep the ball rolling with your PET computer!







```
Ø REM*** WORKS ON ORIGINAL PET 2ØØ1-8,
      ¬ NEW PET/CBM, BASIC 4.Ø, & CBM ¬
      ¬8Ø16 & 8Ø32
1 REM***PET SKETCH - INTERACTIVE ¬
      ¬GRAPHIC RUNNER
2 REM***ORIGINAL PROGRAM BY LEN LINDSAY
3 REM***(C) 198Ø
4 REM***Ø1-16-8Ø
5 REM***QUICK INSTRUCTIONS ARE PART OF ¬
      ¬THE STARTING SCREEN
6 REM***THEY DISAPPEAR WHEN YOU SEEM TO ¬
      ¬BE CATCHING ON (EXCEPT ON CBM ¬
      ¬8Ø32& 8Ø16)
7 REM***FEEL FREE TO HIT -ANY- KEY ¬
      ¬(EXCEPT STOP)
8 REM***HIT STOP TO STOP, OTHER KEYS ¬
      ¬HAVE VARIOUS EFFECTS
9 REM***
15 POKE 59468,12 : REM GRAPHIC MODE
2Ø PRINT"ĥ"; : REM CLEAR SCREEN
```

```
30 PC$="W":CL$=PC$:REM STARTING TRAIL
32 R$="Q←" : REM MOVE BALL RIGHT
34 L$="←←Q←" : REM MOVE BALL LEFT
36 U$="↑←Q←" : REM MOVE BALL UP
38 D$="↓←Q←" : REM MOVE BALL DOWN
40 RD$="↓Q←" : REM MOVE BALL RIGHT DOWN
42 LD$="↓←←Q←" : REM MOVE BALL LEFT DOWN
44 RU$="↑Q←" : REM MOVE BALL RIGHT UP
46 LU$="↑←←Q←" : REM MOVE BALL LEFT UP
50 GOSUB3000:REM PRINT SHORT NOTES
98 PRINT"h";:REM HOME CURSOR
99 REM START WITH THE LETTER P
100 MB$=D$ : NB=23 : GOSUB 1000
110 MB$=R$ : NB=2  : GOSUB 1000
120 MB$=U$ : NB=12 : GOSUB 1000
130 MB$=R$ : NB=9  : GOSUB 1000
140 MB$=U$ : NB=11 : GOSUB 1000
150 MB$=L$ : NB=11 : GOSUB 1000
160 MB$=D$ : NB=2  : GOSUB 1000
170 MB$=R$ : NB=9  : GOSUB 1000
180 MB$=D$ : NB=7  : GOSUB 1000
190 MB$=L$ : NB=7  : GOSUB 1000
200 MB$=U$ : NB=11 : GOSUB 1000
210 REM THE LETTER P IS DONE - DO THE E ¬
      ¬NEXT
220 MB$=R$ : NB=12 : GOSUB 1000
230 MB$=D$ : NB=23 : GOSUB 1000
240 MB$=R$ : NB=10 : GOSUB 1000
250 MB$=U$ : NB=2  : GOSUB 1000
260 MB$=L$ : NB=8  : GOSUB 1000
270 MB$=U$ : NB=10 : GOSUB 1000
280 MB$=R$ : NB=7  : GOSUB 1000
290 MB$=U$ : NB=2  : GOSUB 1000
300 MB$=L$ : NB=7  : GOSUB 1000
310 MB$=U$ : NB=7  : GOSUB 1000
320 MB$=R$ : NB=8  : GOSUB 1000
330 MB$=U$ : NB=2  : GOSUB 1000
340 MB$=L$ : NB=9  : GOSUB 1000
350 REM THE E IS DONE - DO THE T NEXT
360 MB$=R$ : NB=12 : GOSUB 1000
370 MB$=D$ : NB=2  : GOSUB 1000
380 MB$=R$ : NB=4  : GOSUB 1000
390 MB$=D$ : NB=21 : GOSUB 1000
```

```
400 MB$=R$ : NB=2  : GOSUB 1ØØØ
410 MB$=U$ : NB=21 : GOSUB 1ØØØ
420 MB$=R$ : NB=5  : GOSUB 1ØØØ
430 MB$=U$ : NB=2  : GOSUB 1ØØØ
44Ø REM THE T IS DONE NOW GO BACK TO ¬
      ¬THE START
45Ø MB$=L$ : NB=38 : GOSUB 1ØØØ
92Ø GOTO 1ØØ : REM DO IT AGAIN
999 END : REM SUBROUTINE FOLLOWS
1ØØØ FOR X=1 TO NB : REM NUMBER OF ¬
      ¬BALLS TO PRINT
1ØØ5 GETCH$:IFCH$>""THENGOSUB2ØØØ
1Ø1Ø :PRINT CL$; : REM CLEAR PRESENT ¬
      ¬BALL
1Ø2Ø :PRINT MB$; : REM MOVE BALL
1Ø3Ø NEXT X : REM DO NEXT BALL
1Ø4Ø RETURN : REM GO BACK FOR NEXT TRACK
2ØØØ IFCH$="r̲"THENRV$="r̲":CL$=RV$+PC$:
      ¬GOSUB5ØØØ:RETURN
2Ø1Ø IFCH$="r̂"THENRV$="r̂":CL$=RV$+PC$:
      ¬RETURN
2Ø2Ø IFCH$="h̲"ORCH$="ĥ"ORCH$="↓"ORCH$="↑
      ¬"ORCH$="→"ORCH$="←"ORCH$="̲""THENRE
      ¬TURN
2Ø3Ø IFCH$=CHR$(2Ø)ORCH$=CHR$(13)ORCH$=C
      ¬HR$(141)ORCH$=CHR$(34) THEN RETURN
2Ø4Ø PC$=CH$
2Ø5Ø CL$=RV$+PC$
2Ø6Ø IFFL=ØTHENGOSUB4ØØØ:FL=1
2Ø99 RETURN
3ØØØ PRINT"h̲↓↓↓↓↓↓↓↓↓↓↓↓↓";:REM START ¬
      ¬LINE
3Ø1Ø PRINTTAB(5);"HIT ANY";TAB(18);"TRY ¬
      ¬r̲SPACE"
3Ø2Ø PRINTTAB(5);"KEY TO"
3Ø3Ø PRINTTAB(5);"CHANGE";TAB(18);"TRY ¬
      ¬r̲RVS"
3Ø4Ø PRINTTAB(5);" THE"
3Ø5Ø PRINTTAB(5);"TRAIL";TAB(18);"TRY ¬
      ¬r̲OFF"
3Ø99 RETURN
4ØØØ PS=32768+525:GOTO5Ø1Ø
```

```
 5ØØØ PS=32768+538
 5Ø1Ø FORX1=ØTO4
 5Ø2Ø FORX2=ØTO8
 5Ø3Ø POKEPS+X2+4Ø*X1,32
 5Ø4Ø NEXT
 5Ø5Ø NEXT
 5Ø99 RETURN
READY.
```

Special Guest Lectures

These lectures are designed for computer Phreques! They are extracurricular activities. So, if you're not a purist, skip on to the fun and games; but if you're curious, let Dr. Wacko guide you on a fascinating tour through your PET's inner self.

CURRICULUM

Lecture 1: INTRODUCTION AND "THE REPEATING GIZIT" OR "WHY IS MY COMPUTER STUTTERING?"

Course Synopsis: In this lecture, Dr. Wacko shows you a "zippy" program that POKEs around in your PET's brain, causing it to stutter.

Lecture 2: "THE MYSTERIOUS DISAPPEARING CURSOR" AND "THE EVAPORATING QUESTION MARK"

Course Synopsis: Dr. Wacko puts on his black cape and beanie to teach you some computer magic. First you'll wonder where the cursor went. Next you'll be astounded when Dr. Wacko "evaporates" the question mark right before your very eyes.

Lecture 3: "IT'S GETTING NOISY AROUND HERE"

Course Synopsis: Did you know that your PET can make sounds? Let Dr. Wacko teach you the secret.

Lecture 4: "LOOP-DE-LOOP"

Ride the LOOP-DE-LOOP with Dr. Wacko and learn how much fun it is to go around in circles.

Lecture 5: "I DIDN'T KNOW THERE WERE SO MANY ERRORS"

Course Synopsis: Virtually every error imaginable is covered in this comprehensive lecture. Dr. Wacko outdoes himself when he reveals his much touted ERROROONIE PROGRAM.

Lecture 1

Introduction

Let me introduce myself. I am the famous Dr. C. Wacko, the world's foremost Professor of "Computerology." If you aren't acquainted with my course, let me spend a few minutes telling you some of the wondrous and exciting things we'll be covering.

By the way, if any of you don't feel up to my lectures, don't be ashamed—just hold your PET up in one hand and you'll be excused to play games or whatever you'd like. I know that you'll be missing a lot by not attending these informative lectures, but the fact that I get paid as a direct ratio of attendance should have absolutely no bearing whatsoever on your decision. The dedicated souls who finish this short course will receive the honorary degree of C.W.S. (Computer Wacko Science). You'll have learned how to POKE around inside your PET's brain and perform feats of legerdemain. You will become intimately acquainted with your computer.

Now that we've gotten that out of the way, let's dive right into the material and not waste a minute more.

The Repeating Gizit

To begin with, I am going to teach you one of my smaller brainchilds. By entering just two lines—yes, you heard me correctly, just two lines of programming—your PET will get so confused that when you hold a key down, the characters you enter will virtually zip across the screen, repeating themselves over and over again until you lift your finger.

First, let me give you my secret formula.

For those of you with the "new" PET, enter this:

NEW PET:

```
1Ø  GET A$ : IF A$=" "   THEN 1Ø
2Ø  PRINT A$; : POKE 151,   255 : GOTO 1Ø
```

If you've got the "older" PET, enter this:

OLD PET:

```
1Ø  GET A$ : IF A$=" " THEN 1Ø
2Ø  PRINT A$; : POKE 515, 255 : GOTO 1Ø
```

If you don't know what vintage you have, try both programs.

POKing Around

Before we run this program, I'd like you all to notice the word *POKE* in the above listings. What we are doing here is actually poking around inside your PET's brain, talking to its subconscious, so to speak. We are bypassing the PET's BASIC language and communicating directly with the machine language that keeps your PET from going as wacko as the rest of us. By uttering POKE, you make your PET fall into a deep hypnotic trance and do all sorts of unusual things for us.

Why Is My Computer Stuttering?

Now, let's RUN this zippy program. After you type in RUN and hit RETURN, type in anything you'd like. See, it works!

Every time you hold down a key, that letter will repeat itself until you lift your finger!

When I first tried this experiment, I typed in: "THE GREAT DR. C. WACKO PHD" (I like to see my name in lights). And this is what happened

```
RUN
TTTHHHHHEEEE  GRRREEAAAATTD DDRR..
CCCCCCC.  WWWWACCCCKKOOO PPPHHHDDD
```

Actually, class, we have our PET so confused that it's stuttering!

At first I was worried that I was POKing around with my PET too much, so I devised another clever program that will accomplish the same zippy result without POKing around.

Are you taking notes? O.K., I see you've got your PET in front of you now, so here's the program. It is so versatile it will work with either the new or older model PETs.

```
NEW AND OLD PETS:
1Ø  GET A$ : IF A$=""   THEN 1Ø
2Ø  PRINT A$; : GET B$ : IF B$="" THEN 2Ø
3Ø  A$=B$ : GOTO 2Ø
```

Be careful. Don't put any space between the quotation marks.

As you can see, this program is a little longer but accomplishes the same result as the first program without POKing around in your PET's brain.

Lecture 2
The Mysterious Disappearing Cursor

To lighten things up, let's try a little computer magic. Abracadabra—we'll make the cursor disappear. Yes, you've guessed it, the name of this feat of legerdemain is *The Mysterious Disappearing Cursor.*

Before I wrap a turban around my head and bring out my magic wand, I'd like to show you how our PET normally responds to an INPUT command. During this brief illustration, please keep your eyes on the blinking cursor, and remember—I have absolutely nothing up my sleeve!

First, prepare your PET to ask for your name with this INPUT Statement:

```
1ØINPUT   "WHAT IS YOUR NAME";  N$
```

Now that your PET is properly primed, RUN this short program. Look at that! Your PET asks WHAT IS YOUR NAME?, and the cursor is winking and blinking merrily away. All is well in Computerland. Answer your PET by typing in your name.

Before we perform our magic trick of making the cursor disappear, let's see how smart your PET is. Let's check to see if it still remembers the name you entered. To ask it, just enter:

```
PRINT N$
```

and Hit RETURN

See, your PET is smarter than you thought and will respond by printing the name exactly as you previously entered it. (If it didn't, your PET isn't smart enough to understand this trick. I take no responsibility whatsoever!)

Here comes the moment you've all been waiting for. Watch what I do and follow my lead. Prepare the PET by entering the command:

```
NEW
```

and Hit RETURN

Now that we've cleared our PET's memory and it has responded with the word READY, we are ready to proceed. Watch closely as I enter these commands. Do exactly as I do, and the cursor will magically disappear.

For those of you with the new PET, enter this:

```
1Ø   POKE 168, Ø   :   INPUT "NAME";   A$
2Ø   PRINT A$
```

If you've got the older PET, enter this:

```
1Ø   POKE 549, Ø   :   INPUT "NAME";   A$
2Ø   PRINT A$
```

As you will notice, class, we are again POKing around in our PET's mind.

All set? All right, RUN the program. Does your screen look like this?

```
RUN
NAME? GEORGE
GEORGE
READY.
```

If it does, then you've proceeded correctly, and amazingly enough the blinking cursor has MYSTERIOUSLY DISAPPEARED. Why not finish the trick by answering your PET? Just type your name and see what happens. I'll put in my name as an example.

```
RUN
NAME? DR. C. WACKO
DR. C. WACKO
```

Try replacing the Ø in this program with some other number, just to see the result. Since "Ø" made the cursor temporarily disappear, see what happens when you replace it with, say, 255 or 128. They both work! (Would I kid you?) Now, before your very eyes, I will make the blinking cursor return. I'll just replace the Ø with the number 1Ø and RUN the program. Unbelievable! The cursor has returned from the mystical void.

So much for the MYSTERIOUS DISAPPEARING CURSOR. Now, onto our next bit of sleight-of-hand: THE EVAPORATING QUESTION MARK.

That's right, class. I will eliminate the question mark that our PET has so thoughtfully included. We'll just POKE around in its brain once more. Watch carefully as I program my PET and do as I do.

With the new PET, enter this:

```
1Ø  INPUT  "NAME";  A$  :  PRINT A$
2Ø  POKE 14, 1  :  INPUT "NAME";  B$  :  PRINT B$
3Ø  PRINT A$  :  PRINT B$
```

If you have the older PET, enter this:

```
1Ø  INPUT  "NAME";  A$  :  PRINT A$
2Ø  POKE 3, 1  :  INPUT "NAME";  B$  :  PRINT B$
3Ø  PRINT A$  :  PRINT B$
```

All set? Before we get carried away, let me explain each line of this fantastic program. Line 1Ø is a standard INPUT and your answer will be printed on the screen. Line 2Ø is the same INPUT and PRINT as in Line 1Ø. However, we have preceded Line 20 with one POKE statement. Line 3Ø simply PRINTS both names INPUT in Lines 1Ø and 2Ø. Now that we're ready, let's try a few RUNs of this glorious program. Here's what I saw on the screen of my PET:

```
RUN
NAME? DR.
DR.
NAMEȻ. WACKO C. WACKO
DR.
C. WACKO
READY
```

If you watched closely, after I input my first name, "DR.", my PET printed it on the screen *after* the question *and* on the next screen line. It then asked me to enter my NAME again, but this time, since I've POKEd around in its brain, it forgot to add a question mark. Amazing!

Playing Tricks on Your PET

Now that we have successfully evaporated the question mark, let's fool around with this program and really try to confuse our poor little PET. Try another RUN, but this time *don't* type any answer to the question—just hit RETURN.

Uh-oh! That stopped the program! I think we've upset the poor little fellow. He gets very angry when we refuse to answer his questions. So angry, in fact, that he interrupted our program at that point.

One last interesting experiment with this program before we move on. RUN the program once again, and this time answer the *first* question but just hit RETURN for the second question. Ah hah! Now you can't break out of the program by refusing to answer.

Why does this happen, you may ask? Elementary, my dear class—your INPUT was preceded by a special POKE. I suppose we've gotten our just desserts. Playing around with our PET's subconscious produces some interesting results, but we have to be careful not to let things get out of control!

Lecture 3
"It's Getting Noisy Around Here"

Clickety, click, click, click.

Do you hear that click coming from my PET? If you put your ear next to the tape unit, you would be able to make out a faint clicking noise. Music to my ears! Would you like your PET to produce this noise? You would? O.K., I'll show you, but BEWARE—what we'll be doing is cycling the switch that controls your software tape units, and if we do this too much we'll be straining the poor little critter. Here goes. Just enter this program and RUN it:

WARNING!

DANGEROUS TO
PET'S HEALTH!
(MORE THAN ONCE
OR TWICE WILL
BURN OUT THE
RELAY!)

```
OLD AND NEW PETS:
1Ø T=TI
2Ø POKE 59411, 53 : POKE 59411, 61
3Ø IF TI<T + 1Ø THEN 3Ø
4Ø GOTO 1Ø
```

You don't hear anything? Turn off your stereo, the blender in the kitchen, and the TV; quiet down your parakeets and tropical fish; and listen attentively with your ear *on* the tape unit. Eureka! It works! Clickety, click, click . . . .

Before we move on to more serious matters, those of you who are using the *new* PET are about to discover that your system has a joke built into it. To get a real laugh, just enter the following command, hit RETURN, and you'll see the punch line:

```
WAIT 65Ø2, 4

RETURN
```

You don't get it? Let me give you a little clue. The company that wrote the BASIC interpreter for your PET is MICROSOFT. Now it should all be crystal clear. By the way, in place of the 4, you may enter any number from 1 to 255 to get a similar result. Why not give it another try?

```
WAIT 65Ø2, 2Ø
```

Lecture 4
"The Astounding Loop-de-Loop Program"
OR
"What's That Blinking Cursor Doing Here?"

Get ready for another of my patented "Wacko" experiments. Today, we are going to delve into your PET's subconscious again, and POKE around a little. In my last lecture, I showed you how to remove the automatically added question mark, and before that, I baffled you with the "Disappearing Cursor." Now we're going to trick your PET into blinking a cursor when it usually doesn't.

A little background first. Your PET can be programmed to ask for information without having to use the INPUT statement. An appropriately named GET may be used instead. In this experiment, we'll have the GET attempt to get one character from the keyboard input. When programmed this way` your PET normally will look for an input, and if it doesn't see that any key has been hit, it will simply forget about it and go on to the next statement. A GET doesn't wait for you, like an INPUT does—it's a little impatient.

I, the dubious Dr. Wacko, have a solution for this of course. I'll just add a command immediately after the GET to check if a character has been entered. If it hasn't, your PET will go back and try again. This loop will continue until you hit a key. I'll write my astounding loop-de-loop program on the blackboard so you can all enter it into your PET:

```
1Ø   GET A$   :   IF A$="" THEN 1Ø
```

Aha! If you are very observant, you have noticed that as long as A$="" (or A$ equals nothing or null) your PET will keep loop-de-looping back to Line 10. However, as soon as you hit a key it will stop. To make sure that your PET got the character that you hit, just type in:

```
PRINT A$
```

Egads, it remembers! But, did you notice that while your PET was waiting for you to hit a key it didn't blink a cursor like it would after an INPUT? Have no fear, we can alter this situation by POKing around a little.

In the new PET, we'll POKE 167, Ø and in the older PET, we'll POKE 548, Ø.

New-fangled PET owners, just enter this:

NEW PET:

```
1ØGET A$
2ØIF A$=" " THEN POKE 167, Ø : GOTO 1Ø
3Ø PRINT A$; : GOTO 1Ø
```

Older PET owners (we're referring to PET's age, not yours), enter this:

OLD PET:

```
1ØGET A$
2ØIF A$=" " THEN POKE 548, Ø : GOTO 1Ø
3ØPRINT A$; : GOTO 1Ø
```

Let's try the program. Type in a few lines, hit RETURN a few times, and watch the cursor blinkety-blink-blink-blink—when it's not supposed to! Amazing! If you replace the Ø that follows the POKE statement with a 1, your PET will cease blinking and return to normal.

Lecture 5
Dr. Wacko's Erroroonie Program

You can make all sorts of mistakes when entering or running programs on your PET, and when you do, your PET will tell you by displaying an *error message*.

Now, I'm going to ask you to put on your thinking caps and do a little exercise. If you'll look at the blackboard, you will see that I've listed your PET's most common error messages. Review these, and try to make the mistake that will cause your PET to give you this message. Remember, anyone can do it right, but it takes a real computer phreque (like the defused Dr. Wacko) to go out of his or her way to do it wrong!

See how many of these mistakes you can make on your own. When you've finished reviewing the list of the *MOST Common PET Misdemeanors*, I'll go over each one in my lecture.

```
?OUT OF DATA ERROR
?DIVISION BY ZERO ERROR
?ILLEGAL DIRECT ERROR
?ILLEGAL QUANTITY ERROR
?BAD SUBSCRIPT ERROR
?NEXT WITHOUT FOR ERROR
?RETURN WITHOUT GOSUB
?FILE OPEN ERROR
?FILE NOT OPEN ERROR
?NOT INPUT FILE ERROR
?NOT OUTPUT FILE ERROR
?DEVICE NOT PRESENT
?CAN'T CONTINUE ERROR
?OVERFLOW ERROR
?REDIM'D ARRAY ERROR
?STRING TOO LONG ERROR
?SYNTAX ERROR
?TYPE MISMATCH
```

```
?UNDEFINED STATEMENT
?OUT OF MEMORY ERROR
?FILE DATA ERROR
?REDO FROM START
```

I see that you're all finished, and you all did just fine! I'll bet you never thought there were so many ways you could turn the tables on your PET. Let's start at the top of the error list and produce each error message. Your goal is *to do nothing right*!

?OUT OF DATA ERROR To get this error message, simply ask your PET to READ some DATA and then—don't provide any! You can do this with the direct command:

```
READ A$
```

?DIVISION BY ZERO ERROR It's simple to make this mistake. Just ask your PET to divide any number by zero, such as:

```
PRINT 56/Ø
```

It can't do a thing!

?ILLEGAL DIRECT Your PET is perfectly capable of distinguishing between running a program and executing a direct command that isn't part of a program. Let's get its wires crossed. You can do this by using INPUT, GET, or DEF in a direct command. Try this:

```
INPUT   "WHAT IS YOUR NAME";   A$
```

?ILLEGAL QUANTITY There are quite a few things you can do to get this error—in fact, the possibilities for confusing your PET may be infinite. Here are some:

You can OPEN a file numbered from 1 to 255 only. Then—

```
OPEN 256, 3
```

You can't have a negative number raised to a non-integer power if you're using variables to represent the numbers. So:

```
A=-1 : B=.5 : PRINT A[UP ARROW] B
```

You can't compute the square root of a negative number. But why not try?

```
PRINT SQR(-4)
```

You also can't compute the LOG of a negative number, as in:

```
PRINT LOG(-7)
```

Subscripted variables are allowed only up to reasonable limits. Dr. Wacko says: "Why be reasonable?"

```
A$(76543)=Ø
```

You can't have a negative subscripted variable. Says who?

```
A$⟨-3⟩=Ø
```

Your PET will say it for you:

ERROROONIE!

?BAD SUBSCRIPT ERROR In the previous error message, we saw some bad subscripts, but they caused an *illegal quantity error* rather than a *bad subscript error*. You will get a *bad subscript error* when you have a subscript that is greater than 1Ø (or greater than the number set by a DIM statement) and less than 32768. Try this:

```
A(11)=Ø
```

?NEXT WITHOUT FOR ERROR This is quite easy. Just issue a NEXT X command before a FOR (putting the cart before the horse, so to speak—a common occurrence in the life of Dr. Wacko). Example:

```
NEXT
```

?RETURN WITHOUT GOSUB This one has lots in common with the previous message. This time your PET found a RETURN and had no previous GOSUB to fall back on (all dressed up and nowhere to go). Example:

```
RETURN
```

?FILE OPEN ERROR Try opening the same file a second time when you've foolishly neglected to close it the first time! Example:

```
OPEN 3,3 : OPEN 3,3
```

?FILE NOT OPEN ERROR This one is not as easy as you may have thought! I bet you tried to CLOSE a file that you didn't yet OPEN. Even Dr. Wacko fell into that trap. But alas, the PET will cheerfully let you close any file, even one that you didn't even OPEN. But you *will* get this message if you try to PRINT#4, INPUT#4, or GET#4 before you OPEN that file. (Incidentally, the file number can be from 1 to 255 with a device number from Ø to 16.) Example:

```
PRINT#3
```

?NOT INPUT FILE ERROR It should be obvious to you how to produce this error message, but then what would you need Dr. Wacko for?

To perpetrate this particular confusion, try to INPUT data from a file that you identified as an OUTPUT file.

```
OPEN 1,1,1 : REM OPEN TAPE#1 FOR A WRITE
```

Press PLAY on Tape #1 (no need to put in a tape—PET's already confused enough).

Wait a few seconds.

```
INPUT#1,A$
```

?NOT OUTPUT FILE ERROR This one should be a dead giveaway. All you have to do is try to OUTPUT data to a file you have defined as an INPUT-only file.

However, this is easier said than done.

It was easy for you to fool the PET into thinking we were *writing a tape*, but it's much harder to trick it into thinking you are *reading* one.

I knew you couldn't do it without me! Example:

```
OPEN 1,1    : REM OPEN TAPE#1 FOR A READ
```

Hit the STOP key on your keyboard.

```
PRINT #1
```

Another way is to OPEN your keyboard (device #Ø) for INPUT and then PRINT. Follow the leader:

```
OPEN 1,Ø
PRINT#1
```

?DEVICE NOT PRESENT This one is a wee bit tricky. If you don't have any devices connected to your IEEE Port, it can actually be quite easy. Simply OPEN an OUTPUT file to a device higher than 3 and PRINT# to it:

```
OPEN 4,4
PRINT#4
```

However, if you have a PET Printer and PET Disk nicely hooked up to your computer, you often won't get this message, even if you've cleverly turned off both devices. In order to produce this superfluous slip-up, you must go to the entirely unnecessary trouble of disconnecting your disk and/or printer from PET's edge connector. *Real* computer wackos go to a lot of trouble!

?CAN'T CONTINUE ERROR Your clever little PET remembers the last line executed when it's running a program. However, its memory is short. So, first enter a short program and then enter CONT:

```
1Ø REM
CONT
```

Be advised—PET won't oblige you with the required response if there's no program in the computer. If you pull this trick on an empty PET, the little tyke will simply blink at you and say READY.

?OVERFLOW ERROR If you know about exponents, this message is easy as pie. (If you don't know about exponents, what kind of a computer phreque are you?) Anyhow, try this:

```
PRINT 99999[UP ARROW] 99999
```

It appears that PET will not allow any number above 1.70141184550E38. Now try these:

```
PRINT 1.7Ø14118455ØE38
PRINT 1.7Ø14118455Ø1E38
```

What about an UNDERFLOW ERROR? Good question, class—you thought you had me that time! Well, there's no such thing. If an underflow occurs, PET simply rounds it off to Ø.

?REDIM'D ARRAY ERROR This one carries the clue within its message. Got it? No? Tsk, tsk, tsk. I'll give you a break: you only have to try to DIM the same subscripted variable twice to end up with this message:

```
DIM A(1),A(1)
```

Or:

```
DIM B(4)
DIM B(12)
```

?STRING TOO LONG ERROR Now this is really an easy one—you're limited to an 80-character line for keyboard entry. However, you can go up to 255 characters in a string, and strings can be concatenated (added or tacked together). Armed with this knowledge, you should be able to get this Erroroonie:

```
A$="A" : FOR X=1 TO 255 : A$=A$+A$ : NEXT
```

?SYNTAX ERROR This is one you've seen frequently, if you've spent any time at all around computers and aren't just sneaking into class to get out of Home Ec.

To get SYNTAX ERROR, all you have to do is misspell a BASIC word, forget a comma or parenthesis, or just enter plain garbage, all of which should come easily to you if you're any kind of aspiring computer phreque. For example:

```
Q
```

?TYPE MISMATCH No, no, no! You're *not* allowed to mix strings with numbers. Naughty of you, trying to equate a string variable with a numeric expression. PET fights back with this response. Try:

```
A$=5
```

Or

```
A="WRONG"
```

?UNDEFINED STATEMENT Your PET doesn't take kindly to things that don't exist, literal-minded critter that it is. This error message will appear if your PET is instructed to GOTO, GOSUB or IF THEN to a line that does not exist. This is PET's way of giving us the raspberry when we try to lead it up the garden path. Try:

```
NEW
GOTO 5
```

?OUT OF MEMORY ERROR Of course, it's nothing to get this message when you're *actually* out of memory! We computer phreques disdain anything so simple, direct, and obvious. The trick is to get this message when you still have memory left.

For example:

```
1Ø FOR X=1 TO 2Ø: GOSUB 1Ø
```

and we get the OUT OF MEMORY message. Now:

```
PRINT  FRE (Ø)
```

and you'll see that you still have plenty of memory available.

How did we create this delusion? What happened is that you overflowed the stack that the PET keeps to remember its FOR NEXT and GOSUB return points.

Here is a way to run out of memory by allocating or "reserving" more than you actually have available:

```
1Ø DIM A(99,99)
RUN
```

Or

```
1Ø DIM A(9999)
RUN
```

The hard way to get this message is to keep entering a very long program until sooner or later you run out of memory. No normal person would sit around all day doing this, but—are you a normal person? If so, what are you doing in my class?

?UNDEF'D FUNCTION ERROR This is simple to get if you have the lamentably sane, organized, normal habit of defining user functions. Cut it out! Ask the PET to perform a function that you haven't defined yet, such as:

```
PRINT FNA(1)
```

?FILE DATA ERROR To get this error, open the screen for input of a numeric variable and have it read in nonnumeric data. Follow me:

```
1Ø OPEN 3, 3
2Ø PRINT"ABC[UP] "
3Ø INPUT#3, A
```

?REDO FROM START I've been told this many times, especially when I submitted my doctoral thesis on SCRAMBLED BASIC. This particular message is less drastic—it's PET informing you in its unique way that you've entered a nonnumeric piece of data in response to an input requesting numeric data. It's quite simple. Do this:

```
1Ø INPUT A
RUN
A [RETURN]
```

Of course, you can hit any key in place of A—if you insist on being experimental and original—as long as the key isn't numeric.

BREAK

That's exactly what I need right now, after guiding all you junior computerologists through myriads of error messages. Of course, my classes have often shouted this at me, and PET is saying something quite similar. It's informing you that it was in the middle of processing when it was rudely interrupted.

You can get this message by hitting the STOP key while the PET is busy trying to process one of your programs. Example:

```
For X=1 TO 9999 : NEXT
```

Now, hit the STOP key. It shouldn't happen to a PET!

Last, but not least, here's:

HOW TO CHEAT

Now that you saw how to get each of the previous error messages to be displayed, here is a program that will cause 18 of them to appear with *only one RUN*. Now, how's that for cheating!

Before you are awarded your honorary degree in Computer Wacko Science RUN the following program to see just how many ways a computer phreque can go wrong:

```
5 PRINT"?";
1Ø FOR X=49553 TO 498Ø2
2Ø : IF PEEK(X)>191 THEN PRINT CHR$(PEEK(X)-128);
   "  ERROR" : PRINT "?" : X=X+1
3Ø :PRINT CHR$(PEEK(X));
4Ø NEXT X
5Ø PRINT "[UP]";
```

Now, simply RUN the program and see that you get just what you deserve!

What's this? Another student has modified the six-line cheating program to fit into just *two* (2) program lines? Unbelievable! Here it is:

```
1 PRINT"?"; :FORX=49553TO498Ø2:IFPEEK(X)›191THEN
    PRINTCHR$(PEEK(X)-128)" ERROR" :PRINT"?"; :
    X=X+1
2 PRINTCHR$(PEEK(X)); :NEXT :PRINT"[UP] "; :END :
    REM1 RUN DISPLAYS 18 ERROR MESSAGES (NEW
    ROM)
READY.
```

I see that those of you who are crowding around the door instead of sleeping on top of your terminals have successfully made it through my course. I'm proud of all of you, so tell all your friends about my lectures. Now that you're all certified computer wackos, you may continue on to the Graduate School of Games. Remember, the motto of the computer wacko is never to follow orders blindly. If there's a way to do something, there's also a way to undo it! You may proceed to the graduation exercises and onto the playing fields!

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THE BOOK . . .

PET Games and Recreations is a delightful menagerie of diversions, carefully designed to entertain *and* educate. It's ideal for beginning programmers and equally challenging for computer veterans. Game enthusiasts of all ages will love the variety and excitement.

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